



*Now widely accepted for Tuberculosis Case-Finding—*

## TUBERCULIN PATCH TEST (VOLLMER)

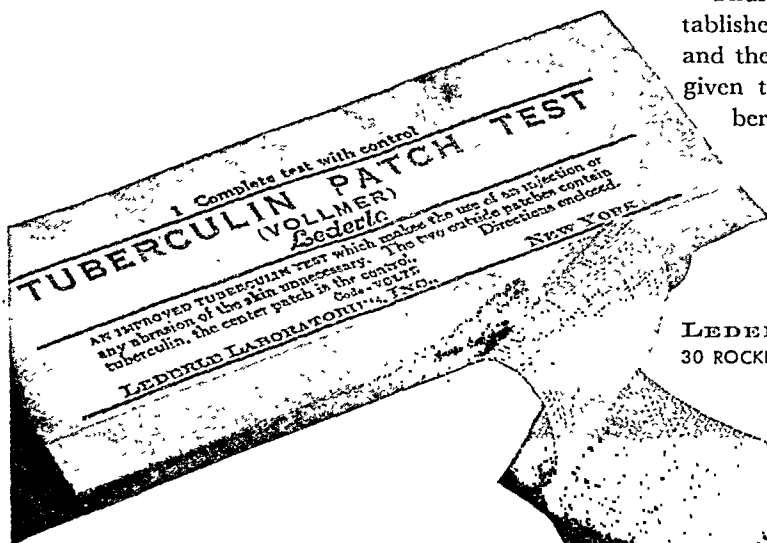
*Lederle*

LIVING UP TO ADVANCED PREDICTIONS made soon after its introduction a few years ago the "Tuberculin Patch Test (Vollmer) Lederle" has now gained widespread acceptance. Pediatricians, public health authorities and practitioners here and abroad have adopted this simplified and reliable case-finding method.

Cooperation, the *sine qua non* for the successful pursuance of any tuberculosis case-finding program—whether it be one child or an entire institution—is easily won when the "Tuberculin Patch Test (Vollmer) Lederle" is employed.

Children do not object to the Patch Test because there is no hypodermic needle involved. Fearsome preparations are conspicuous by their absence. The test is painless! Even the most timid child cooperates, for he is familiar with the basic vehicle of the Patch Test—adhesive tape. Parents may be assured of the safety of the Patch Test, since no focal or general constitutional reactions have been reported. The physician or health officer applying the test appreciates the ease and dispatch with which he is able to conduct his program.

Thus with friendly relationships established between the doctor, the patient and the family, added impetus is being given to active campaigns against tuberculosis all over the country.



LEDERLE LABORATORIES, INC.  
30 ROCKEFELLER PLAZA NEW YORK, N. Y.

### PACKAGES:

1 test; 10 tests  
and 100 tests.



# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

January, 1941

Number 1

## CONTENTS

	PAGE
Mazýck P. Ravenel, M.D. . . . .	<i>Frontispiece</i>
Appreciations of the Editor Emeritus . . . . .	1
<i>Robert Wilson, M.D.; William Charles White, M.D.; Arthur W. Hedrich, Sc.D.; Henry F. Vaughan, Dr.P.H.; C. C. Young, Dr.P.H.; Richard H. Shryock; John F. Norton, Ph.D.; Friend Lee Mickle, Sc.D.; J. C. Geiger, M.D.; James A. Tobey, Dr.P.H.</i>	
The Bibliography of Mazýck P. Ravenel, M.D., from 1891 to date . . .	7
Etiology of the Anemias . . . . .	10
<i>Cyrus C. Sturgis, M.D.</i>	
Engineering Services in Industry Other than Control of Occupational Diseases . . . . .	21
<i>Joel I. Connolly</i>	
Use of Existing Visiting Nurse Services for Industrial Work in Small Plants .	27
<i>Ruth W. Hubbard, R.N.</i>	

*Continued on page vi*

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear. These are not to be regarded as expressing the views of the American Public Health Association unless formally adopted by vote of the Association.

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Reader's Guide in your Library.

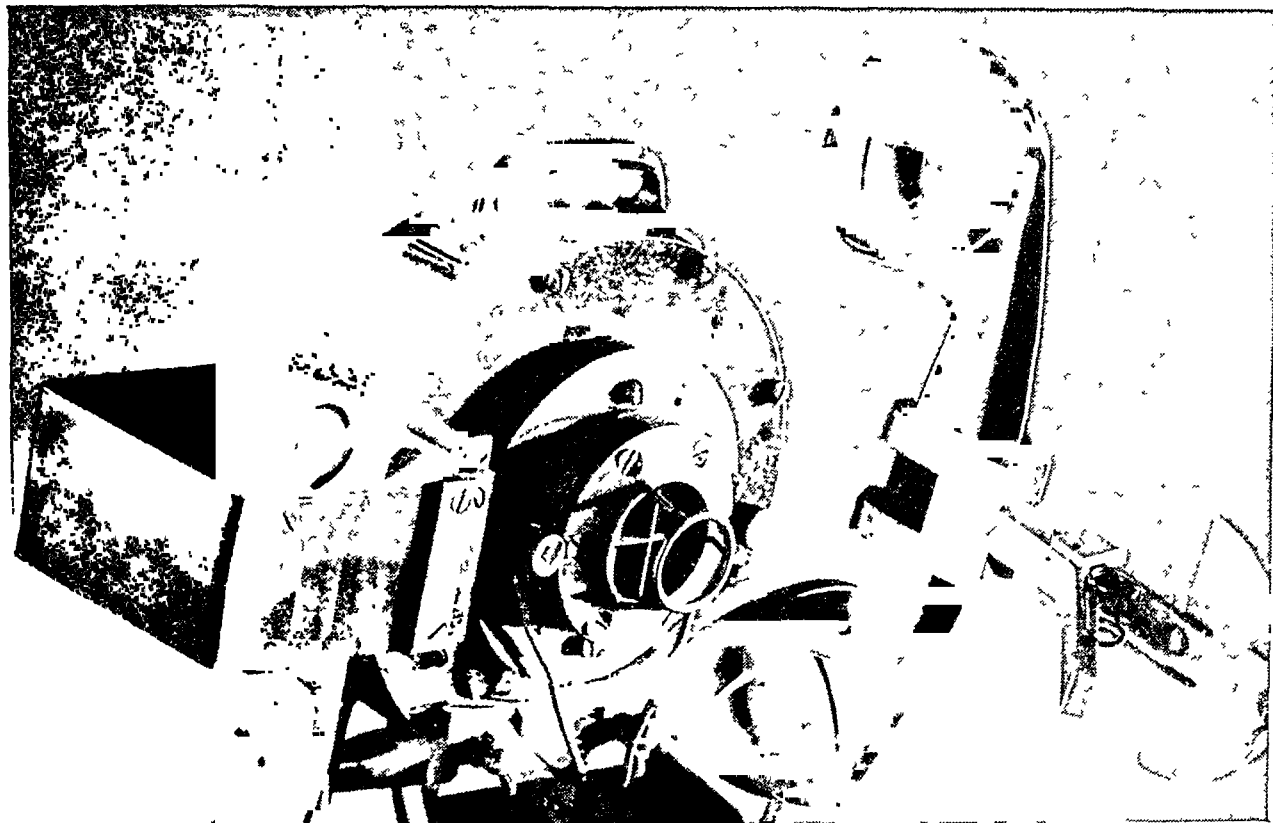
Published by the American Public Health Association at 374 Broadway, Albany, N. Y.  
Executive Office, 1790 Broadway at 58th St., New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States, Cuba and Mexico, South and Central America; \$5.50 for Canada; and \$6.00 for other countries. Single copies 50 cents postpaid. Copyright, 1941, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor, Mazýck P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 1790 Broadway at 58th St., New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.



## SAID THE ELECTRICAL MOUTH TO THE ELECTRICAL EAR . . .

*"Joe took father's shoe bench out.  
She was waiting at my lawn."*

If you were passing through the Bell Telephone Laboratories today you might hear an electrical mouth speaking this odd talk, or whistling a series of musical notes, to a telephone transmitter.

This mouth can be made to repeat these sounds without variation. Every new telephone transmitter is tested by this mouth before it receives a laboratory or manufacturing O.K. for your use.

This is only one of the many tests to which telephone equipment is subjected in the Bell Telephone Laboratories. And there is a reason for the selection of those particular words.

It happens that the sentence, "Joe took father's shoe bench out," and its more lyrical companion, "She was waiting at my lawn," contain all the fundamental sounds of the English language that contribute to the intensity of sound in speech.

Busily at work in the interest of every one who uses the telephone is one of the largest research laboratories in the world. The outstanding development of the telephone in this country is proof of the value of this research. In times like these, the work of the Bell Telephone Laboratories becomes increasingly important.

*The Bell System is doing its  
part in the country's program  
of National Defense*



### BELL TELEPHONE SYSTEM

When writing to Advertisers, say you saw it in the JOURNAL

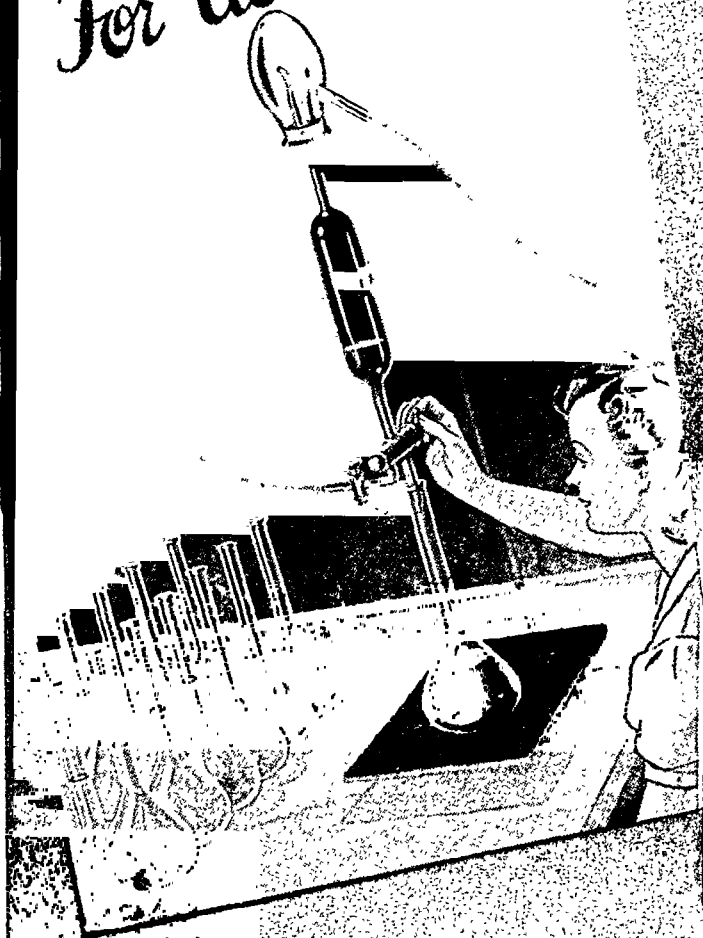
<i>Contents—Continued</i>		PAGE
Bacteriological Diagnosis of Pneumonia in Relation to Chemotherapy . . . . .	<i>Colin M. McLeod, M.D., and George S. Mirick, M.D.</i>	34
Principles of Administration Applicable to Health Departments . . . . .	<i>Lent D. Upson, Ph.D.</i>	39
A County Program for the Care of Prematures . . . . .	<i>H. R. O'Brien, M.D., and Marion I. Murphy, R.N.</i>	45
Observations on the Familial Incidence of Cancer . . . . .	<i>James A. Crabtree, M.D.</i>	49
Antirabic Vaccination—Present Status . . . . .	<i>Leslie T. Webster, M.D.</i>	57
Typhoid Typing in the Western States . . . . .	<i>Alfred S. Lazarus, Ph.D.</i>	60
Some Trends in Public Housing . . . . .	<i>L. M. Graves, M.D., and Alfred H. Fletcher</i>	65
Massachusetts State Program for the Care of Prematures . . . . .	<i>Florence L. McKay, M.D.</i>	72
EDITORIALS:		
American Journal of Public Health—Vol. 31, No. 1—January, 1941 . . . . .		79
The Editor Emeritus . . . . .		80
Raymond Pearl, 1879–1940 . . . . .		81
A Notable Pasteurization Record . . . . .		82
Credit Lines: A Selective Digest of Diversified Health Interests— <i>D. B. Armstrong, M.D., and John Lentz, M.D.</i> . . . . .		84
“Thank You” Note. Some Notable Health Publications of 1940. Going—Going—Almost Gone! Smallpox Dispatch. J.A.M.A. Articles. Noted and Quoted.		

*Continued on page viii*

*Reprint prices furnished upon request*

# WHY RETESTED?

*For Assurance*

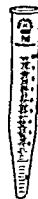


THE control laboratories of industry are vital nerve centers safeguarding production and quality. In times of emergency, they are strained to capacity, for trained workers are harder than ever to secure.

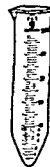
With each technician operating on a full-production basis, the re-calibration of volumetric glassware AFTER it is purchased and BEFORE being used is a troublesome, time-wasting procedure.

For this reason, KIMBLE <sup>NORMAL</sup> GRADUATED GLASSWARE and KIMBLE BLUE LINE <sup>GLASS</sup> WARE are preferred because they are already RETESTED when they arrive on the job! The Kimble Glass Company—long experienced in producing accurate Laboratory Glassware—does this work for you. When you unpack a piece of Kimble RETESTED ware it is ready for immediate service!

## TYPICAL BLUE LINE ITEMS



45165



45186

## CENTRIFUGE TUBES BLUE LINE Calibrations

### RETESTED

CAT. NO.	SIZE	EACH	QUANTITY IN CASE
45165	10 ml	\$0.35	36
	15 ml	.45	72
	50 ml	.60	72
45186	50 ml	.60	72

For quantity prices, consult your dealer.

**Kimble** <sup>BLUE LINE</sup> THE PIONEER OF COLORED CALIBRATIONS

© 1941, KIMBLE GLASS CO.



STOCKED BY LEADING LABORATORY  
SUPPLY HOUSES THROUGHOUT THE  
UNITED STATES AND CANADA.

• • • • The Visible Guarantee of Invisible Quality • • • •

**KIMBLE GLASS COMPANY . . . . VINELAND, N. J.**

NEW YORK • CHICAGO • PHILADELPHIA • DETROIT • BOSTON • INDIANAPOLIS

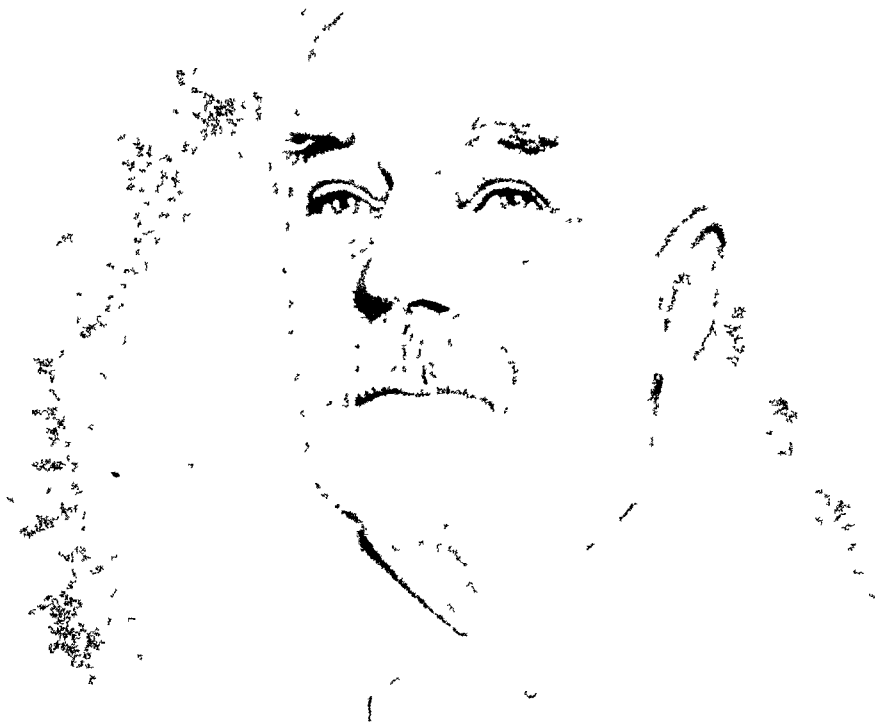
Contents—Continued

	PAGE
Books and Reports . . . . .	88
Public Health Administration in the United States (2nd ed.). The Public Health Nurse and Her Patient. The Rockefeller Foundation, International Health Division, Annual Report, 1939. Mind Explorers. Men Against Madness. Medicolegal and Industrial Toxicology, Criminal Investigation, Occupational Diseases. Graphic Presentation. Sex in Marriage. Children in a Democracy. Manual of Industrial Health Hazards. Principles of Psychiatric Nursing. Marriage. Chemistry and Medicine: Papers Presented at the Fiftieth Anniversary of the Founding of the Medical School of the University of Minnesota. The Public Welfare Administrator. First Aid to Injured and Sick (42nd ed.). Helping Adults to Learn: The Library in Action. Influence of a Public Health Program on a Rural Community. Veterinary Bacteriology. An Anatomical Analysis of Sports. How to Work with People. Administrative Cost Analysis for Nursing Service and Nursing Education.	
Books Received . . . . .	99
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . . .	100
Association News . . . . .	103
Applicants for Membership. Deceased Members. New Fellowship Application Blank.	
Employment Service . . . . .	105
News from the Field . . . . .	107
Conferences and Dates . . . . .	114

INDEX TO ADVERTISERS

	Page		Page
A. P. H. A. ....	X	Directory of Health Service (Cont.).....	XXIV
Book Service .....	XVII, XX	Information Service, A.P.H.A. ....	XXIII
Membership Application Form.....	XVIII	Federation of Sewage Works Associations	XVII
Affiliated Societies and A.P.H.A. Branches	XVIII	Florida Citrus Commission.....	XXIII
Aluminum Seal Company.....	XII	International Equipment Company.....	VII
American Can Company.....	XXV	Kimble Glass Company.....	III
American Meat Institute.....	XXI	Lederle Laboratories, Inc.....	IX
American Telephone and Telegraph Co...	V	Merck & Co., Inc.....	XIII
Bell Telephone System.....	V	National Drug Company, The.....	XXII
Canadian Public Health Association.....	XXII	N.O.P.H.N. ....	XXII
Corning Glass Works.....	XI	Public Health Nursing.....	XXIV
Difco Laboratories, Inc.....	Back Cover	Pyrrex Brand Laboratory Ware.....	XI
Directory of Health Service.....	XXIV	Squibb, E. R., & Sons.....	XIX
Pendiner & Schlesinger Laboratories		Trained Nurse, The.....	XXIV
Black & Veatch		Wallace & Tiernan Co., Inc.....	XIV
Committee on Administrative Practice,		Westinghouse X-Ray Co., Inc.....	II
A.P.H.A.		Wisconsin Alumni Research Foundation..	XVI





*Mazyck P. Ravel, M D.*

*Painting by Albert Adams Sloan, hung in the Library of the School of Medicine, McAlister  
Hall, University of Missouri, Columbia. Presented to the University  
by former students*

# American Journal of Public Health and THE NATION'S HEALTH

---

Volume 31

January, 1941

Number 1

## Appreciations of the Editor Emeritus

UPON the announcement of the appointment of Mazÿck P. Ravenel, M.D., as Editor Emeritus of the *American Journal of Public Health* after 16 years of devoted service as Editor and Editor-in-Chief, many letters of appreciation of Dr. Ravenel as a man, as a scholar and as an inspiration to younger men have been received. The Editorial Board has asked some of the writers to express their thoughts for the *Journal* and they are printed here in token of a widely-held sentiment.

ROBERT WILSON, M.D., Dean, Medical College of the State of South Carolina, Charleston, S. C.

Among the Huguenots who fled from France after the revocation of the Edict of Nantes and settled in the Province of Carolina was René Ravenel, of Vitré in Brittany, sieur de la Massais. Shortly after reaching Charles Town he married Charlotte, daughter of Pierre de St. Julien, sieur de Malacare, who had emigrated to Carolina at the same time. From this union derive all in South Carolina who bear the name Ravenel. Later marriages introduced other Huguenot strains, such as Porcher, Mazÿck, Gaillard.

From the earliest days of the Colony members of the Ravenel family have been conspicuous in business, in medicine, and in science. Notable among these was Dr. Edmund Ravenel, Professor of Chemistry in the first faculty of the Medical College of South Carolina, at one time serving as dean (1829-1834). He achieved national distinction as a conchologist, and his catalogue of shells, which was published in 1834, was the first work of its kind to appear in America.

His nephew, Dr. St. Julien Ravenel, under the inspiring influence of Louis Agassiz and Dr. J. E. Holbrook, after a few years spent in the practice of medicine, devoted himself to the pursuit of chemistry. His work in agricultural chemistry and his discovery of the value of the phosphate deposits near Charleston were potent factors in the rehabilitation of South Carolina after the war between the states. It was Dr. Ravenel's inventive genius which produced the torpedo boat *Little David*, whose attack on the *Ironsides*, the flagship of the squadron blockading Charleston during the war, initiated a new type of naval warfare.

In the field of botany Henry W. Ravenel, LL.D., achieved international reputation. In the forefront of American scientists, he was also a correspondent and member of several European botanic societies.

Such is the background of energy, of culture, and of eminent scientific achievement inherited by Dr. Mazÿck Porcher Ravenel, and his own life of fruitful cultivation of the field of medical science has exemplified the best ideals of the family tradition.



WILLIAM CHARLES WHITE, M.D.,  
Chairman, Committee on Medical  
Research, National Tuberculosis  
Association, Washington, D. C.

"Dr. Ravenel: Am I right or wrong  
in understanding that the German Com-  
mission has ascertained the bovine type  
of the bacillus to be the cause of a case  
of military tuberculosis of the lungs?

"Prof. Koch: I have asked whether  
any case exists of tubercle bacilli of the  
bovine type in pulmonary tuberculosis,  
and not in military tuberculosis.

"Dr. Ravenel: Am I right or wrong  
in saying that the German Commission  
has published a case of that kind?

"Prof. Bank: I think you are  
right."

These few sentences are taken from  
the famous conference in camera of the  
Sixth International Congress on Tuber-  
culosis in Washington in 1908 when a  
group of scientists from many nations  
assembled to question Prof. Robert  
Koch on the relation of the bovine  
bacillus to human disease. They ex-  
press as well as any the character of  
Mazýck P. Ravenel. Always seeking  
the truth and expressing it in forth-  
right manner.

Dr. Ravenel has been a power in  
tuberculosis experiment and control.  
His earlier work in the Veterinary  
Department of the University of Penn-  
sylvania and in the State Livestock  
Sanitary Board of that state with Pear-  
son and Gilliland had a great influence  
on the thought of that time. His dem-  
onstration of the rapid appearance in  
the thoracic duct of tubercle bacilli  
introduced into the intestines of the dog  
gave excellent proof that lung infection  
could come from infection through the  
gastrointestinal tract.

In recent years Dr. Ravenel has been  
interested in the British work of Stanley  
Griffith and others who found fairly  
frequently bovine tubercle bacilli to be  
the cause of pulmonary tuberculosis in  
man in regions where little control of

bovine tuberculosis was carried on. But  
in the United States, where an intensive  
bovine tuberculosis eradication pro-  
gram has been pursued, the few at-  
tempts made have failed to show their  
presence in human pulmonary tuber-  
culosis in this country.

Dr. Ravenel's name, now and in the  
future, will be remembered by those  
interested in tuberculosis literature,  
either human or bovine, for his active  
laboratory and educational work in this  
field.

ARTHUR W. HEDRICH, Sc.D., Chief,  
Bureau of Vital Statistics, State  
Department of Health, Baltimore,  
Md.

What a godsend Dr. Ravenel's six-  
teen years of service as editor have been  
to the Association may be judged from  
the fact that the *Journal* had had four  
editors in less than eight years prior to  
his incumbency.

When I became secretary of the Asso-  
ciation, in 1917, that officer was ex-  
officio and by financial necessity editor  
of the *Journal*. Most of the work was  
done at night, and the principal worries,  
as I remember them, were to get the  
editorials written, and to erase enough  
authors' corrections from the proofs to  
keep the printer's bill within bounds.

The *Journal* was practically insolvent.  
I think that it is now proper to record  
that it was Dr. W. A. Evans, then  
president of the Association, who, to  
pay off the printer, made a donation of  
\$1,500, which he insisted should be  
anonymous. He and his successor as  
president, Dr. Lee K. Frankel, also  
stimulated activities which, within  
about five years, doubled the member-  
ship of the Association, and initiated  
exhibits and other revenue measures  
which increased the budget of the Asso-  
ciation from \$15,000 to about \$50,000.

It may have been the erroneous cred-  
iting of an article by W. H. Frost to  
Trask on the cover of the *Journal* which

dramatized the need of editorial assistance, and resulted in the appointment of John Ritchie, Jr., editor of the "Clinic" column of the *Boston Transcript*, as associate editor of the *Journal* in 1918. When the Association moved to New York, in 1921, Kenneth Gould succeeded him, but resigned before long to accept a more lucrative position. Dr. Henry Vaughan served as Chairman of the Editorial Committee until 1924, when Dr. Ravenel took over. Those who have been close to the *Journal* realize how great a boon to the Association it has been to have had, for sixteen years in charge of the *Journal*, a man of Dr. Ravenel's scholarly attainments, scientific background, and devotion to the cause.

HENRY F. VAUGHAN, DR.P.H., Commissioner of Health, Detroit, Mich.

On the occasion of the fifty-first annual meeting in Cleveland, in 1922, the members of the American Public Health Association approved a revision of the Constitution and By-Laws which materially strengthened our organization, provided for the creation of its standing committees, and established a Fellowship for those members who have attained a degree of recognition in our chosen avocation. At this same meeting, Dr. Mazÿck P. Ravenel was selected as a member of the Editorial Committee, and took over the responsibilities for editorials in the *Journal*, which at that time greatly needed financial as well as literary support.

Since that momentous meeting in Cleveland, our *Journal* has grown from an ordinary association record book into the outstanding public health publication in this country and attained a high degree of respect and recognition in other lands. Through its original contributions and its editorial comment, it has become an indispensable part of the armamentarium of every public health worker. This is due to the un-

tiring efforts of Dr. Ravenel whose dream of a great publication has been fully realized.

As a member of the small group who served with Dr. Ravenel from the time that he assumed this obligation of love for, and belief in, our association and its purposes, I have witnessed the inspiration which he has given to others and the friendships and associations which have been created through mutual professional interest.

I am delighted to hear that Dr. Ravenel will continue this outstanding service which he has given us of the public health field by maintaining an association with the *Journal* and the new editorial board.

C. C. YOUNG, DR.P.H., Director of Laboratories, Michigan Department of Health

I have known Dr. Ravenel for over thirty years and I was associated with him for many years on the editorial board of the *American Journal of Public Health*. Whenever, through indolence or ignorance, I was unable to get information on anything, my quest ended by writing to Dr. Ravenel. In not one instance did he ever fail to produce the exact information, page and paragraph, I needed. He has a most amazing fund of practical and useful information.

However, the thing that has always endeared Dr. Ravenel to me is his love of puncturing balloons. When some person set himself up as an oracle, invariably Dr. Ravenel would find the weak spot and without hesitation proceed to annihilate that person. He started young. In the early 1900's, I think it was 1901, he took issue with Koch and announced definitely at the International Conference for Tuberculosis that Dr. Koch did not know what he was talking about—that there was a definite difference between bovine and human tuberculosis and that a

human being could be infected with bovine tuberculosis. I do not know of another person, no matter how right he might think he was, who would have had the temerity to disagree with Koch.

Throughout Dr. Ravenel's long scientific and editorial career, that trait of character has never been sacrificed to expediency. I always have thought of him as the paternal castigator—he can give a spanking and make the recipient like it.

RICHARD H. SHRYOCK, Chairman, The History Department, University of Pennsylvania, Philadelphia, Pa.

There are many better qualified than I to express appreciation of Dr. Ravenel's direct services to the public health—past, present, and future. As an historian, however, I welcome this opportunity to emphasize the value of his work for social history in general, and for the story of public health developments in particular. Every profession needs a few leaders who can at times stand off from the pressing problems of the moment and so view the past as to enlighten their colleagues on the direction in which they have been moving. Dr. Ravenel has done much, in this way, to provide an historical perspective on the whole public health program in this country, and this is no small service to his profession.

At the same time, Dr. Ravenel's historical studies are of great potential value to all social historians. As the latter come to realize more clearly the vital significance of the story of health and disease in the evolution of any society, they will increasingly appreciate his pioneer contributions to the medical history of the American people. The volume which he edited for the Association in 1921, entitled "A Half Century of Public Health," will long remain one of the essential references for those concerned with the half-century following 1870. Certain of his articles,

moreover, are invaluable guide posts to lay interpreters of the past, since they indicate clearly the relative significance of various aspects of the history of disease. This is notably true of his essay on "Endemic Diseases Versus Acute Epidemics," which appeared in the *Journal* in 1920.

I should like to conclude this brief tribute on a note of personal appreciation. Some years ago, when a graduate student, I made fumbling attempts to express the importance of the public health in the social development of the nation. There was at first small encouragement from historians, who felt that all this might be medicine but that it hardly was "history." At this point I happened to write Dr. Ravenel, and I shall never forget the care and kindness he displayed in encouraging an entirely unknown youngster to go ahead in what was then an unorthodox historical field. I am sure that Dr. Ravenel will continue in the future to lend similar encouragement and leadership to all of us who share his enthusiasms.

JOHN F. NORTON, PH.D., Head, Bacteriological Department, The Upjohn Company, Kalamazoo, Mich.

We see Dr. Ravenel as a gilt edged volume of the *American Journal of Public Health*—a consolidation of sixteen years of editorial endeavor to produce a journal of which we are proud. A portrait of the man emerges from rereading letters received through a portion of his period of service. Joy in editorial work is evident, but at times he has found difficulty in maintaining a patient attitude toward authors who are unable to write good English, who submit articles of unnecessary length, or who indulge in obscure technicalities.

With the realization that editors are accused of all sorts of crimes—carelessness, procrastination, or the prime scientific sin of being behind the times

—he has persisted in his successful ambition to make our journal outstanding in its field, and is proud of the fact that it is read and quoted throughout the world. His own sense of fallibility has led him to seek editorial advice from a variety of individuals. While this is an index of broadmindedness, its more important result has been to give many of us a rare and fully appreciated opportunity to be associated with one who has so much to contribute from so unusual a store of knowledge in the field of public health.

FRIEND LEE MICKLE, Sc.D., Director,  
Bureau of Laboratories, State Department of Health, Hartford, Conn.

I appreciate Dr. Ravenel because he has brought to the *American Journal of Public Health* a breadth of culture and scholarly ability which has lifted the *Journal* to its present high estate as a journal of applied hygiene. He has successfully bridged the difficult gap between research and its practical application. As I look at the wealth of material which Dr. Ravenel has brought us across these sixteen years I am impressed with his alertness and the discerning way in which he has chosen the contents. For his discrimination we are grateful. For his strict avoidance of any taint of commercialism we thank him. For his magnificent historical perspective and for his almost humorously critical comments we can be grateful now in the long perspective of the years. I like a rugged individual, ready to stand for his convictions, with a love for his work, and with absolutely no ax to grind for any living soul. His has been an undivided loyalty to the *Journal* and to the Association. The prospect of his continuing guidance through a transitional stage reassures us as we look forward with confidence to the leadership of Dr. Mustard and the Editorial Board.

J. C. GEIGER, M.D., Director of Public Health, City and County of San Francisco, Calif.

The selection of Dr. Mazÿck Porcher Ravenel to be Editor Emeritus of the *American Journal of Public Health* warrants more than passing comment from students of public health in these United States.

Dr. Ravenel's career has been replete with important and fundamental work affecting the public health of the world; as a teacher of students he is unparalleled; as an editor his comments on the data submitted have always been accurate, unassailable, and markedly helpful to authors; and, best of all, his friendship was always loyal, everlasting and much sought.

As a health officer, may I add, most inadequately, my appreciation of his many accomplishments in the field of public health, and my sincere affection for a great character and gentleman. Long may he live and serve.

JAMES A. TOBEY, Dr.P.H., Former Associate Editor, *American Journal of Public Health*, New York, N. Y.

The vitality of this *Journal*, or of any journal, depends mainly upon the character of its editor. He guides its policies, writes most of its editorials, inspires literary zeal in his associates, and uses proper discrimination in the selection of contributors and commentators. He imbues the magazine with the spirit of his personality, and makes of it a living, vibrant expression of the best professional and public opinion.

All of these things, and more, have been done for the *American Journal of Public Health* by Dr. Mazÿck P. Ravenel during the past sixteen years. As chairman of the editorial committee since 1925 and as editor-in-chief since 1931, he has brought to his task both scientific acumen and literary skill. Under his guidance the *Journal* has helped to stimulate gratifying progress

in public health. It has served not only as the mentor but as the acknowledged spokesman of an active public health profession.

Those of us who have been privileged to work closely with Dr. Ravenel in the conduct of this *Journal* have found much

to admire, and also to revere, in the genuineness of his character and in his rôle as a militant scientist, scholar, and editor. It is fortunate that Dr. Ravenel's wealth of experience and his distinguished service will continue to be available as Editor Emeritus.

## The Bibliography of Mazÿck P. Ravenel, M.D., from 1891 to date

1. General Anaesthesia. *Tr. South Carolina M. A.*, Charleston, 1891.
2. *Trichorexis Nodosa*. *Med. News*, Philadelphia, 61:489, 1892.
3. The Artificial Feeding of Infants. *Tr. South Carolina M. A.*, Charleston, 1892.
4. A Contribution to the Study of the Etiology of Membranous Rhinitis. *M. News*, Philadelphia, 66:537; 574, 1895.
5. Notes on the Bacteriological Examination of the Soil of Philadelphia. *Mem. Nat. Acad. Sci.* First Memoir, Vol. VIII. Government Printing Office, Washington, D. C., 1896.
6. Bacteriology in Its Relation to Veterinary Science. *J. Comp. Med. & Vet. Arch.*, 18:12; 79, 1897.
7. Tuberculosis and Milk Supply. *J. Comp. Med. & Vet. Arch.*, 18:753-761, 1897.
8. Milk Supply from the Bacteriological Standpoint. *J. Comp. Med. & Vet. Arch.*, 19:215-225, 1898.
9. Agar-Agar, The Preservation of Culture Media. *J. Applied Microscopy*, Vol. 1, 1898.
10. A Case of Foetal Tuberculosis in a Calf. *Proc. Path. Soc. Philadelphia*, n.s., 2:133-135, 1898-99.
11. A Case of Foetal Tuberculosis in a Calf. *J. Comp. Med. & Vet. Arch.*, 20:163, 1899.
12. Anthrax. The Influence of Tanneries in Spreading the Disease. *Philadelphia M. J.*, Apr. 22, 1899.
13. The Resistance of Bacteria to Cold. *M. News*, June 10, 1899.
14. An Experiment in the Transmission of Syphilis to Calves. *Am. J. M. Sc.*, 119:420-423, 1900.
15. Registration of Tuberculosis. *Philadelphia M. J.*, 6:93, 1900.
16. Three Cases of Tuberculosis of the Skin Due to Inoculation with the Bovine Tubercle Bacillus. *Philadelphia M. J.*, 6:125-126, 1900.
17. A Case of Pneumonomycosis Due to the *Aspergillus Fumigatus*. *Univ. M. Mag.*, Philadelphia, 1900.
18. A Case of Pneumonomycosis Due to the *Aspergillus Fumigatus*. *J. Comp. Med. & Vet. Arch.*, 21:451-465, 1900.
19. The Rapid Diagnosis of Rabies. Preliminary Report. *J. Comp. Med. & Vet. Arch.*, 21:404-406, 1900.
20. An Experiment in the Transmission of Syphilis to Calves. *J. Comp. Med. & Vet. Arch.*, 21:264-268, 1900.
21. A Case of Aneurysm in a Chicken. *J. Comp. Med. & Vet. Arch.*, 21:228-229, 1900.
22. The Dissemination of Tubercle Bacilli by Cows in Coughing: a Possible Source of Contagion. *Univ. M. Mag.*, Philadelphia, 13: 648-651, 1900.
23. The Rapid Diagnosis of Rabies. *Univ. M. Mag.*, Philadelphia, 13:766-775, 1901.
24. A Note on the Disinfectant and Deodorant Action of Ammonium Persulphate. *Univ. M. Mag.*, Philadelphia, 13:852-853, 1901.
25. Tuberculosis of Cattle and the Pennsylvania Plan for its Repression. *Bull. No. 75*, Commonwealth of Pennsylvania, Dept. of Agriculture, 1901.
26. Diagnosis of Rabies. *J.A.M.A.*, 36:517, 1901.
27. Rabies. *Buffalo M. J.*, n.s., 40:724-734, 1901.
28. Rabies. *Bull. No. 79*, Commonwealth of Pennsylvania, Dept. of Agriculture, 1901.
29. The Comparative Virulence of the Tubercle Bacillus from Human and Bovine Sources. *Lancet*, 2:349-356, 1901.
30. The Rapid Diagnosis of Rabies. Contrib. f. *Wm. Pepper Lab. of Clin. Med.*, Philadelphia, Vol. 2, 1901.
31. A Case of Tuberculosis of the Skin Following Accidental Inoculation with the Bovine Tubercle Bacillus. *Univ. Pennsylvania M. Bull.*, Philadelphia, 14:453, 1902.
32. The Intercommunicability of Human and Bovine Tuberculosis. *Univ. Pennsylvania M. Bull.*, Philadelphia, 15:66-87, 1902.
33. The Intercommunicability of Human and Bovine Tuberculosis. *Extr. des Proc. Path. Soc.*, Philadelphia, 1902.
34. Melanosis of the Cerebro-spinal Meninges. *Univ. Pennsylvania M. Bull.*, Philadelphia, 1902.
35. The Clinical Manifestations of Hydrophobia. *J.A.M.A.*, 40:753-756, 1903.
36. Experiments in Disinfection with Formaldehyde Gas. *Univ. Pennsylvania M. Bull.*, Philadelphia, 16:66-78, 1903-04.
37. The Occurrence of Tubercle Bacilli of Exalted Virulence in Man. *Public Health Papers and Reports*, A.P.H.A., 28:459-463, 1903.
38. The Warfare Against Tuberculosis. *Proc. Am. Phil. Soc.*, Philadelphia, 42:212-219, 1903.
39. A Pathology for Forage Poisoning, or

- the So-called Epizootic Cerebrospinal Meningitis of Horses. *J. Med. Res.*, 10:243-249, 1903.
40. The Passage of Tubercle Bacilli Through the Normal Intestinal Wall. *J. Med. Res.*, 10:460-462, 1903.
41. Bovine Tuberculosis a Factor in the Causation of Human Tuberculosis. *Maryland M. J.*, 47:63-72, 1904.
42. The Specific Treatment of Tuberculosis. *Pennsylvania M. J.*, 7:235-238, 1903-04.
43. The Influence of Bovine Tuberculosis on Human Health. *M. News*, New York, 84:876-880, 1904.
44. Animal Tubercloses and Their Relation to Human Health. *Montreal M. J.*, 33:397-407, 1904.
45. Tabes Mesenterica Due to the Bovine Tubercle Bacillus. *Proc. Path. Soc. Philadelphia*, n.s., 8:89-93, 1905.
46. Report of Committee on the Bacillus Tuberculosis in Man and Animals. *Public Health Papers and Reports*, A.P.H.A., 30:133, 1905.
47. Report on the Comparative Study of Various Forms of Tuberculosis. *Am. Med.*, 10:977-982, 1905.
48. Studies in Agglutination in Tuberculosis. *M. News*, New York, 87:1070, 1905.
49. A Report on Professor Maragliano's Method of Producing a Specific Serum. *Second Annual Report, Henry Phipps Inst. for the Study, Treatment and Prevention of Tuberculosis, 1904-05*, 2:296-310, 1906.
50. Studies in Mixed Infection in Tuberculosis. A Preliminary Report. *Tr. Nat. A. Study & Prev. Tuberc.*, 1:231-238, 1905.
51. Studies in Agglutination. *Tr. Nat. A. Study & Prev. Tuberc.*, 1:140-142, 1905.
52. The Etiology of Tuberculosis. *Am. J. M. Sc.*, 134:469-482, 1907.
53. Anthrax. *Osler's Modern Medicine*, 3:42-51, 1907.
54. Glanders. *Osler's Modern Medicine*, 3:42-75, 1907.
55. Rabies. *Osler's Modern Medicine*, 3:52-69, 1907.
56. Tuberculous Infection Through the Alimentary Canal. *J. Med. Res.*, 18:1-18, 1908.
57. Aetiologie der Tuberkulose; Experimentelles und Statistisches über die tuberkulöse Infektion durch Nahrungsaufnahme und Kontakte. *Berl. klin. Wchnschr.*, 45:788-793, 1908.
58. The Transmission of Tuberculosis Through Milk. *Pediatrics*, 20:564-566, 1908.
59. Mixed Infections in Tuberculosis. *J. A.M.A.*, 51:2047, 1908.
60. Modes and Sources of Infection in Tuberculosis. *Cleveland M. J.*, 8:179-186, 1909.
61. An Unusual Outbreak of Typhoid Fever. *J.A.M.A.*, 52:1635, 1909.
62. Routes of Invasion in Tuberculosis. *Wisconsin M. J.*, 7:682-688, 1908-09.
63. The Etiology of Tuberculosis. In: *Tuberculosis*, Edited by Arnold Klebs, 1909.
64. The Tubercle Bacillus. In: *Tuberculosis*, Edited by Arnold Klebs, 1909.
65. The Presence of Tubercle Bacilli in the Circulating Blood. *J.A.M.A.*, 53:1915, 1909.
66. Detection of Tubercle Bacilli in the Blood by Rosenberger's Method. *Wisconsin M. J.*, 8:464, 1909.
67. The Bacterial Flora of Milk Held at Low Temperatures. *J. Infect. Dis.*, 7:38-46, 1910.
68. Rabies in Wisconsin. *Wisconsin M. J.*, 60:565-571, 1910-11.
69. The Formation and Functions of Hygiene Committees for Universities. *J.A.M.A.*, 56:1253-1256, 1911.
70. Passage of Bacteria Through the Intestinal Wall. *J. Med. Res.*, 24:513-515, 1911.
71. Rabies in Wisconsin and Its Control. *Wisconsin M. J.*, 10:84-89, 1911-12.
72. Control of Bovine Tuberculosis. *Illinois M. J.*, 20:465-471, 1911.
73. Preservation of Water Samples by Salting (Abstract). *A.J.P.H.*, 2:103, 1912.
74. Anti-typhoid Vaccination. *Wisconsin M. J.*, 11:43-45, 1912-13.
75. The Treatment of Diphtheria-carriers by Overriding with *Staphylococcus aureus*. *J.A.M.A.*, 59:690-693, 1912.
76. The Hygiene of Swimming Pools. *J.A.M.A.*, 59:1424, 1912.
77. The Prevention of Tuberculosis in Children by Guarding the Milk Supply. *Tr. Am. A. Study & Prev. Inf. Mortal.*, 2:258-263, 1912.
78. The Hygiene of Swimming Pools. *Am. Phys. Educ. Rev.*, 17:684-691, 1912.
79. The Treatment of Diphtheria Carriers by Overriding with *Staphylococcus aureus*. *Wisconsin M. J.*, 12:35-40, 1913-14.
80. A Study of the Water of Lake Michigan. *A.J.P.H.*, 3:935-943, 1913.
81. The Control of Typhoid Fever by Vaccination. *Proc. Am. Phil. Soc.*, Philadelphia, Vol. 52, No. 209, 1913.
82. The Treatment of Diphtheria Carriers by Overriding with *Staphylococcus aureus*. *Tr. XV Internat. Cong. Hyg. & Demog.*, 1912, 4:170-174, 1913.
83. Bovine Tuberculosis. *Illinois M. J.*, 25:382-386, 1914.
84. History of a Typhoid Carrier. *J.A.M.A.*, 62:2029, 1914.

85. The Education of Health Officers. *J.A.M.A.*, 63:1617-1619, 1914.
86. Report of the Committee on Standard Methods for Bacterial Milk Analysis. *A.J.P.H.*, 5:64, 1915.
87. Preventive Medicine, Its Accomplishments and Its Aims. *Univ. Missouri Bull.*, Vol. 16, No. 9, 1915.
88. An Unusual Result Following Anthrax Vaccination and a Lesson. *Am. Vet. Rev.*, 46:634-638, 1915.
89. Report of the Committee on Standard Methods for the Bacterial Examination of Milk. *A.J.P.H.*, 5:1261, 1915.
90. Present Views in Respect to Modes and Periods of Infection in Tuberculosis. *J.A.M.A.*, 66:613-618, 1916.
91. Reports Upon the Federal Meat Inspection. U. S. Dept. of Agri. *Circular No.* 58, 1916.
92. The Transmission of Bovine Tuberculosis to Human Beings. *Arch. Pediat.*, 34:137, 1917.
93. The Prophylaxis of Venereal Diseases. *Social Hyg.*, 3:185-195, 1917.
94. Military Aspects of Typhoid Fever. *California State J. M.*, 16:312, 1918.
95. Preventive Medicine and War. *A.J.P.H.*, 10:22-33, 1920; also *J. Missouri M. A.*, 17:49-56, 1920.
96. Endemic Diseases vs. Acute Epidemics. *A.J.P.H.*, 10:761-767, 1920.
97. Lesions of Typhoid Fever Produced by *Bacillus Faecalis-alkaligenes*. *J.A.M.A.*, 76:720, 1921.
98. The Semi-Centennial of the American Public Health Association. *Am. J. Clin. Med.*, 28:783-788, 1921.
99. *A Half Century of Public Health*, American Public Health Assn., 1921.
100. The American Public Health Association, Past, Present and Future. *A.J.P.H.*, 11:1031-1041, 1921.
101. The Challenge of the Chronic Patient from the Public Health Standpoint. *Wisconsin M. J.*, 21:435-438, 1922-23.
102. Small-pox and Vaccination. *Brit. M. J.*, 50:351, 1923.
103. Evolution and Preventive Medicine. *A.J.P.H.*, 14:1016-1019, 1924.
104. The Essential Unity of the Wassermann and Precipitation Tests. *South. M. J.*, 18:491-494, 1925.
105. *A Course in Motherhood*. Sect. I., School Extension Co. (1925).
106. The Trend of Public Health Work; Is It Eugenic or Dysgenic? *Sci. Month.*, 23:331-336, 1926; also *Tr. Sect. Prev. Med. & Pub. Health, A.M.A.*, 1926.
107. Prolongation of Life; To What Goal Is It Tending? *A.J.P.H.* (Supp.), 16:1-22, 1926.
108. Inter-relation of Human and Bovine Tuberculosis. *Vet. Med.*, 22:183, 1927.
109. Veterinarian in Field of Medicine. *North Am. Vet.*, 8:51-54, 1927.
110. Preparation and Presentation of Papers. *A.J.P.H.*, 18:140-144, 1928.
111. Tribute to Wyatt Galt Johnston, M. D. *Canad. Pub. Health J.*, 22:517-518, 1931; also *A.J.P.H.*, 21:1243-1245, 1931.
112. Drought and Health., *A.J.P.H.*, 21:1198-1202, 1931.
113. By-Products of Tuberculosis Programs. *Tr. Nat. Tuberc. A.*, 28:279-290, 1932.
114. Tuberculosis of Bovine Origin. *A.J.P.H.*, 23:316-318, 1933.



# Etiology of the Anemias\*

CYRUS C. STURGIS, M.D.

*Professor of Medicine, Director, Thomas Henry Simpson Memorial Institute for Medical Research, University of Michigan, Ann Arbor, Mich.*

FOR many years it has been a useful and reasonable assumption that all anemias, other than those following hemorrhage, are due to an increased destruction or diminished production of red blood cells, or a combination of both. These ideas have the appeal of simplicity and are valuable as a working hypothesis. Unfortunately, however, precise methods for measuring either one of these two mechanisms are not available. What evidence there is at present indicates a strong and justifiable trend toward the acceptance of diminished blood production as the more important immediate cause of the common types of anemia. Furthermore, there is information which suggests that this faulty production results from a diminution of some essential component of the erythrocytes, or a defect in the mechanism which controls the rate of their development.

Since it is not the purpose of this article to consider all of the causative factors of every variety of anemia, only the common types and those for which there exists at least a possible means of prevention or control will be discussed. These may be grouped under the broad divisions of (1) the iron deficiency anemias, (2) the anemias of pregnancy, and (3) the macrocytic anemias.

## THE IRON DEFICIENCY ANEMIAS

The iron deficiency anemias are of universal importance for several reasons.

First, they are exceedingly common although their prevalence has failed to arouse the interest merited; second, it is usually possible to control or, still better, to prevent their occurrence by employing simple and inexpensive measures which are easily administered and completely devoid of harmful effects. These anemias are important not because they produce fatalities *per se*, but as anyone familiar with their clinical picture can readily testify, they contribute greatly to a diminished efficiency, a loss of a sense of well-being, decreased resistance to infection, and in general play a significant rôle in contributing to the disability and the misery of mankind.

There can be no doubt that the nutritional anemia of infancy and childhood, the hypochromic anemia of adolescent girls formerly called chlorosis, the microcytic anemia of pregnancy, and the hypochromic anemia due to blood loss, are all varieties of the same disease which result from a deficiency of available iron in the body. It is logical, therefore, to include the entire group under the broad name of the "iron deficiency anemias." The clinical syndromes presented in all varieties have much in common and differ chiefly because of the age and sex of those afflicted.

\* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

These anemias are of first importance because they occur at any age and in either sex, and are the most prevalent variety observed in clinical medicine. These facts are substantiated by the studies of Davidson, Fullerton, and Campbell, in 1936<sup>1</sup> who examined the blood of 3,500 persons representing a cross-section of the poor of Aberdeen, Scotland. They found an anemia of the iron deficiency type to be present in 41 per cent of the infants under 2 years; 32 per cent of children of pre-school age; 16 per cent of adolescent women; and 45 per cent of adult women. MacKay<sup>2</sup> reports that two-thirds of the women of the hospital class in London had an anemia which she considered to be of this nature. Heath and Patek<sup>3</sup> report that the condition was present in 16 per cent of all women admitted to the wards of the Boston City Hospital. Although a systematic survey has not been made of the incidence of the iron deficiency anemias throughout the United States, clinical experience indicates that it is the most common sort encountered. These figures emphasize that the greatest frequency of this condition is in women and children. Although it is less common in males, nevertheless, it is the most commonly encountered variety in that sex.

In recent years an intensive and profitable study has demonstrated that these anemias are due primarily to the lack of a normal amount of available iron in the body. An inadequate supply of this element means a decrease in the rate of hemoglobin formation with the characteristic findings of hypochromia and diminution in the average size of the erythrocytes. Such an anemia, when uncomplicated, always has a low color index, which is to be expected, as the fundamental abnormality is the inability to synthesize hemoglobin, rather than difficulty in producing red blood cells at a normal rate. The cir-

cumstances leading to such a depletion of the body iron are the following: (1) the loss of iron as the result of a severe, acute hemorrhage, or chronic blood loss; (2) a reduced intake of iron in the diet; (3) the added demand for iron of growth, pregnancy, and lactation; (4) the faulty absorption of iron from the intestinal tract; and (5) the inhibiting effect of any infection on the relationship between iron and normal hemoglobin synthesis.

#### HEMORRHAGE AS A CAUSE OF IRON DEFICIENCY

The most common cause of an iron deficiency anemia of adult life, in either sex, is hemorrhage. A loss of blood means the loss of iron, for 80 per cent or more of the total amount in the body is contained in the circulating hemoglobin. Furthermore, the element is found in the blood in a concentration at least five times that in any other body tissue. All observers agree, however, that uncomplicated acute hemorrhage does not ordinarily result in an iron deficiency. For example, it is estimated that a healthy person might lose 50 per cent of his total blood volume and regain a normal hemoglobin percentage solely by dependence on the normal iron reserves of the body.

Chronic hemorrhage is most likely to occur in the form of continual loss of small, unnoticed quantities of blood over a long interval. It is almost axiomatic that the presence of a hypochromic, microcytic anemia in an adult is the result of protracted bleeding. Such blood loss in females is most likely to be associated with either menorrhagia or metrorrhagia. The importance of an excessive menstrual flow has been greatly underestimated as a cause of this type of anemia, because frequently the patient herself does not recognize that the blood loss is abnormal. The profession is gradually acknowledging the fact that a woman

may lose regularly several times the normal quantity of menstrual blood and yet be completely unaware that this is occurring. Among males the most frequently encountered source of chronic hemorrhage is in the gastrointestinal tract, and this is usually associated with hemorrhoids, peptic ulcer, neoplasm, or cirrhosis of the liver. These causes are also important in females, but their etiological importance is surpassed by menstrual disturbances.

#### DEFICIENCY OF DIETARY IRON

It is doubtful if a reduction of dietary iron alone will produce a deficiency in the body, although it may exert a most important influence in this respect when other causative factors are operating simultaneously. Theoretically, it is unlikely that a healthy adult could possibly partake of a diet so impoverished in iron as to cause a serious depletion of body reserves. This statement is undoubtedly accurate in relation to males and probably also applies to females. It is known, however, that the frequency of these anemias is much greater in women and children. This is readily understandable because of pregnancy and excessive menstrual loss in the former, and the added demands of growth in the latter.

A study of the dietary habits of adults indicates that the amount of the metal ingested usually exceeds the actual body needs, although the precise optimum intake is unknown. An excess in the diet is desirable as it provides a margin of safety to meet such abnormal demands as those created by hemorrhage, illness with a temporary decreased intake, and impaired absorption. It is estimated that the daily iron intake of an adult, in the United States, varies between 8 and 16 mg. with an average of approximately 12 mg. It is considered by some that about 75 mg. of the element is released daily from the breakdown of hemoglobin. This is

based on the assumption that the average life of a red blood cell is 30 days. Balance studies indicate that about 99 per cent of this amount, thus liberated, is conserved by the body and utilized again. The daily iron loss in cell detritus, gastrointestinal secretions, and the urine, has been estimated to be about 1 mg. This amount must be replaced by the diet.

When considering the question of iron intake, the rather troublesome and unsettled problem of the availability of the food iron must be considered. It is a fair statement to say that of all the metal ingested with a general diet probably never more than 50 per cent of it is in the form of available iron. With these statements in mind, it can be assumed reasonably that many persons habitually receive only 6 to 8 mg. of the element daily, which means that 3 to 4 mg. is available to provide for all of the body needs. Even in the case of the healthy, normally menstruating woman, it is probable that this blood loss contributes only about an additional 1 mg. to the daily loss of adults from other sources already stated. This daily average total loss, therefore, of 2 mg. could easily be replaced by the 3 to 4 mg. of available iron in a diet containing only a total of 6 to 8 mg., and an iron deficiency would not result. If these data are accepted, the clinical observation is substantiated that a diet low in iron is rarely by itself a cause of an iron deficiency anemia. It should be recognized as a factor of importance, however, if acting in combination with other causes.

The importance of a subnormal intake is emphasized by the knowledge that the incidence of these anemias is generally proportional to the degree of malnutrition among the inhabitants of any given region. It is possible to predict with reasonable accuracy that if the countries in the present war areas are subjected to famine, there will be

a striking increase in the iron deficiency anemias, provided suitable preventive measures are not instituted. It is also logical to assume that these anemias will not affect normal adult males to any great extent, but will be present chiefly in women and children due to the augmented demands of pregnancy, menstruation, and growth.

#### INCREASED DEMAND FOR IRON DUE TO GROWTH, PREGNANCY, AND LACTATION

It has been emphasized that the iron deficiency anemias occur most commonly in children, and in women during the years of reproductive life. This at once suggests that, at the periods of greatest growth, which occur in infancy and at puberty, and during the time of life when menstruation is present and pregnancies occur, there is a notable increase in the requirement for iron. These conditions are recognized as highly significant contributing factors in the production of the hypochromic microcytic anemias.

The additional needs for iron during the periods of active growth are quite properly ascribed to the augmented total cellular content of the body and the increasing blood volume. As iron is an essential component of every cell in the body, where it probably has a vital function related to cellular metabolism, there must be some increase in this element during the periods of active growth due to an added number of body cells. This is probably not a significantly large amount. A more important need for iron is created by the increase in total blood volume which means that a greater amount of hemoglobin must be synthesized. Heath and Patek<sup>3</sup> have estimated that the total blood volume has an average increase of 340 cc. between the 14th and 15th years. This when combined with an estimated menstrual loss of 650 cc., would total 1,000 cc. or one-fourth of the total blood volume at that age,

which must be produced by the body in addition to other normal demands. While this is readily supplied by a balanced diet, a deficiency will commonly appear if additional factors, such as hemorrhage, an inadequate diet, improper absorption of iron, or infection, are present at this time.

One of the most common types of this anemia is observed in infants, which is the result of a low intake of iron associated with an exclusive milk diet and the increased requirements at this age due to rapid growth. It is most prevalent and of maximum severity at about the end of the first year of life. Although it results chiefly from a diet poor in iron and the normal demands of growth, important contributing factors may be maternal iron deficiency during pregnancy, prematurity, low birth weight, and multiple births. Furthermore, intestinal disturbances, associated with infection, or resulting from improper diet, may greatly reduce the absorption of food iron and so be a major cause of this variety of anemia in infancy.

Anemia resulting from iron deficiency does not occur commonly during the first 6 months of life solely from a low iron intake. This is because an infant has about the same amount of hemoglobin in the body when 6 months of age as at birth, although the body weight may be doubled. The metal is required at this age, therefore, solely to replace that lost from the body and to supply the relatively small amount of cellular iron demanded by growth.

Of course, such an anemia may occur during the first 6 months of life, but it will be due to other factors than a low intake of iron, such as the important contributing factors mentioned. These conditions produce either inadequate fetal storage of iron, or excessive demand for the metal due to the increased rate of growth. Both factors may occur together.

The iron deficiency anemia associated with the gravid state is one of the most important varieties encountered. It will be considered in detail under the heading of the anemias of pregnancies.

#### IMPAIRED ABSORPTION OF IRON FROM THE INTESTINAL TRACT

There is strongly suggestive clinical and experimental evidence which supports the view that the efficiency of the absorption of iron from the gastrointestinal tract has some relation to the hydrochloric acid content of the gastric secretions. It is known that the actual availability of food iron may be greatly reduced by chronic digestive disorders, especially achlorhydria. Although the organic acids provided by fermentation will replace to some extent the action of hydrochloric acid in rendering food iron absorbable, their action is much less efficient. Consequently the absence of hydrochloric acid will have the effect of converting a high iron diet to one low in iron, and will thereby increase the deficiency.

There are other etiological factors concerned with the development of the iron deficiency anemias in addition to those which have been discussed, but our knowledge concerning them is vague. Probably the most important one of this group is chronic infection. While it is known that this will increase the degree of anemia, there is no generally recognized conception regarding its mode of operation. It may be due to the action of toxins which diminish the rate of red blood cell development and hemoglobin formation in the bone marrow; iron excretion may be increased from an accelerated breakdown of body cells; and finally, the intake of iron may be reduced due to a diminished amount of food ingested.

As a final statement concerning these common anemias, it should be emphasized that in any given case, the cause is usually the summation effect of

multiple etiologic factors. It is probable that chronic hemorrhage is the only one which can be solely responsible for such a condition. The others rarely, if ever, by themselves produce an important anemia.

#### ANEMIAS OF PREGNANCY

The importance of the anemias of pregnancy has not been appreciated until recent years. It is now known that their prevalence is very much greater than previous studies indicated, and that a large proportion of them can be satisfactorily controlled by relatively simple therapeutic measures. It is amazing how frequently women are permitted to suffer unnecessarily throughout pregnancy and for some time after delivery, when in most instances this could be completely averted. Furthermore, the proper treatment eliminates the persistent tendency of infants born of mothers who have an iron deficiency anemia to develop the same condition during the first year of life.

Our studies at the Simpson Memorial Institute<sup>4</sup> show that about 54 per cent of all supposedly healthy pregnant women who come to the obstetrical outpatient department of the University Hospital have a pathological anemia. Additional observations over a period of about 2 years in Hillsdale and Allegan Counties in Michigan show that in such areas, which are essentially rural in character, anemia is present in about 30 per cent of all cases. If there are 2,500,000 pregnant women in the United States at any given time, and 30 per cent of them have an anemia, it would mean that 750,000 women are suffering from an easily controlled condition which, if untreated, is a hazard to both mother and child. If these calculations are applied to the world at large, the enormity of the situation is obvious. The public health implications are very clear, and there is no

reason why there should be a continuous disregard for the established facts.

A true anemia of pregnancy is one due primarily to the gravid state, in which there is a decrease in the hemoglobin and red blood cell count or both *below the diminished levels* which are almost universally observed in pregnant women and are properly regarded as normal for the period of gestation. They should also be differentiated from other recognized clinical entities which occur during pregnancy as the result of purely fortuitous circumstances.

Any discussion of this topic is incomplete without a consideration of the normal or physiologic anemia of pregnancy. Failure to recognize the effect of this state has been the stumbling block of many studies concerned with the incidence of these anemias. It has long been known that there is a progressive decline in the numbers of circulating erythrocytes and the hemoglobin during all pregnancies, which begins early in that state and continues to a maximum at about the 6th month. Thenceforth no significant change occurs until about 2 weeks following parturition, at which time the blood returns to normal. This condition is not a true anemia because there is no actual decrease in the total number of red blood cells or the hemoglobin content of the body. It is an apparent anemia dependent upon a simple dilution effect which is due to an increase in the plasma content of the circulating blood.

Several years ago, as the first step in determining the true incidence of anemia in pregnancy, studies were made at the Simpson Memorial Institute<sup>4, 5</sup> to provide specific criteria which permit precise delineation of this physiologic anemia from the pathologic varieties occurring in the gravid state. Briefly, it was determined that a red

blood cell count of less than 3,500,000 per cu. mm. or a hemoglobin content below 10 gm. per 100 cc. of blood (64 per cent of a normal assumed to be 15.6 gm.) constituted definite evidence of a pathological anemia of pregnancy. These criteria were based upon innumerable observations of the blood of normal women of the childbearing age, blood studies in many normal women during and following pregnancy, and certain clinical and experimental observations on the effect of the dilution on the hemoglobin and erythrocyte concentration.

In recent years it has been shown that the true anemias of pregnancy can be classified with two main types. (1) the more commonly occurring hypochromic microcytic type, due to a deficiency of iron which has been previously mentioned, and (2) a macrocytic hyperchromic variety of more obscure etiology but one which has been subjected to recent revealing investigations. The incidence of the two groups is indicated by a study<sup>4</sup> made on the patients of the outpatient maternity service of the University Hospital. It was found that approximately 54 per cent had a pathologic anemia during some stage of pregnancy. Twenty-seven per cent were classified as the iron deficiency type, 15 per cent as the macrocytic type, and in 12 per cent it was considered that both etiological factors were active.

#### IRON DEFICIENCY ANEMIA OF PREGNANCY

The factors leading to a deficiency of iron in the body and the resulting anemia have been discussed previously. There remain only two aspects of the topic for further consideration. The first point to be emphasized is that while pregnancy increases the demand for iron, there is also some conservation of the metal as a result of the absence of menstrual periods during the gravid

state. Although there has been some difference of opinion in regard to this question, the following statement is a fair presentation of the situation. Granting that the iron requirements of normal pregnancy, considering also the bleeding at the time of delivery, is not especially great, it does exceed by two or three times the loss by normal menstruation over a corresponding interval, and so in conjunction with a diet low in iron, a deficiency may be produced. This is particularly true if the pregnancies are repeated frequently.

The second point to be considered is that the normally present physiological anemia of pregnancy greatly intensifies any anemia which may exist as the result of other causes. For example, it is generally agreed that a maximum blood dilution occurs, as a result of hydremia, of about 26 per cent. If the hemoglobin were 70 per cent before pregnancy, this factor alone would reduce it to approximately 58 per cent. The most acceptable view at present is, therefore, that some anemia has existed in many cases prior to pregnancy, and becomes intensified as a result of the physiological hydremia.

Regardless of how this anemia is produced, there certainly exists no difference of opinion concerning the uniformly satisfactory results of treatment with iron. The administration of 0.3 gm. of ferrous sulfate three times daily in almost all instances will promptly restore the circulating blood to normal and give assurance that the infant will not develop an iron deficiency anemia as a result of inadequate reserve of the metal at birth.

#### MACROCYTIC ANEMIA OF PREGNANCY

A macrocytic anemia of pregnancy is one which is characterized by the presence of red blood cells which have an average volume greater than normal and usually a high color index. In some respects the blood picture re-

sembles that of true pernicious anemia. It does not occur as commonly as the hypochromic microcytic or iron deficiency anemia of pregnancy. For example, in a group of 148 supposedly healthy pregnant women it was observed in approximately 15 per cent.

This condition in severe form was known for many years as the pernicious anemia of pregnancy although it was recognized that there were important differences between the two diseases. In the anemia associated with pregnancy, involvement of the spinal cord, common in true pernicious anemia, is absent; free hydrochloric acid may or may not be present in the gastric secretions; and the characteristic leukopenia of pernicious anemia is not always present. Furthermore, following recovery, the patients frequently remain in good health despite subsequent pregnancies. Until recent years our knowledge concerning its cause was vague and speculative. It was attributed by various observers to infection, "toxic" influences, and some type of unclassified disturbance of the endocrine glands. Scant evidence was available to support any one of these etiological possibilities. Careful correlation of the incidence of this variety of anemia with a scrutiny of the patient's food intake has shown<sup>5</sup> that a deficiency of protein is the most commonly occurring dietary defect which suggests that this may be responsible for the anemia.

Additional evidence in support of this view is found in the production of a similar anemia in pregnant rats by a reduction of protein intake, and the prevention or correction of it by the addition of an adequate amount to the diet. Furthermore, it is possible to prevent the condition in humans by providing a diet containing a minimum of 80 gm. of protein of which 50 gm. are supplied by meat, eggs, milk and milk products. For the correction of such an

anemia, larger quantities of animal protein, amounting to 1.5 gm. per kg. of body weight, may be necessary.

An understanding of the etiological relationship between a low protein diet and the macrocytic anemia of pregnancy requires additional investigation for clarification, although the available evidence is highly significant. It has been suggested that a low intake acts on the rate of red blood cell production by producing a widespread change in the liver, thereby hindering an adequate storage of the material responsible for the normal rate of maturation in the bone marrow. This is supported by the knowledge that liver extract evokes a favorable response in such anemias. Another possibility is that a low protein intake is indicative of an inadequate amount of the extrinsic factor of Castle in the diet. This also would lead to a diminished amount of the maturation controlling factor. In accordance with this, is the observation that the administration of large amounts of yeast, which is rich in protein, exerts a favorable influence in some cases.

It is known that in uncomplicated cases of iron deficiency anemia of pregnancy, an increase in the protein intake of the diet is without benefit; likewise the administration of iron is without effect in patients with a hyperchromic macrocytic anemia. It should be emphasized, however, that a "mixed anemia" of dual etiology is not rare, as it was observed in 12 per cent of our cases. In such instances, a hypochromic macrocytic anemia is present and optimum results are obtainable only when both iron and an adequate protein intake are provided.

Granting that our knowledge in respect to the macrocytic and microcytic anemias of pregnancy is incomplete, recent studies have supplied information of an extraordinary practical value. It has been demonstrated that both types are more prevalent than pre-

viously supposed, especially in mild forms; and of prime importance from the standpoint of public health is the knowledge that they can be prevented by the administration of small amounts of iron, and attention to an adequate protein intake. Their prevalence, the absence of unfavorable effects from treatment, and the effectiveness of the therapy from a prophylactic as well as a curative standpoint, suggest strongly that these measures should be employed routinely in all cases of pregnancy.

#### MACROCYTIC ANEMIAS

In recent years a great deal of interest has been centered about the group of macrocytic anemias, in addition to the variety observed during pregnancy which have similar morphological changes in the circulating blood, and, in some instances, a closely related etiology. The characteristic blood changes are an increase in the number of red blood cells having a diameter greater than normal, and an average cell volume which exceeds that present in health. It is from these variations that the name "macrocytic anemia" is derived. They are generally considered to arise from decreased blood formation. Of utmost practical importance is the knowledge that some of them respond dramatically to anti-pernicious anemia therapy. Among this group are included true Addisonian pernicious anemia, the anemias associated with various gastrointestinal disturbances including liver injury, and certain ones attributed to dietary deficiencies.

To understand the etiology of these anemias, it is necessary to present the current views concerning the normal control of red blood cell production in the body, for it is a disturbance in this mechanism which is responsible for at least some anemias of this type. In health, the various steps are as follows: An unidentified but essential substance



(the extrinsic factor) in the diet, interacts with an enzyme-like component (the intrinsic factor) of the gastric juice which is secreted by certain of the gastric glands. According to Meulengracht<sup>6</sup> these are situated in the pylorus, the duodenum, and to a lesser extent in the cardiac region of the stomach. As a result of this interplay, which probably occurs chiefly in the small intestine, a principle is elaborated (the erythrocyte maturing factor) whose specific function is to control the rate of development of the red blood cells in the bone marrow. This factor is absorbed from the small intestine, and is deposited principally in the liver. It is released from it to the bone marrow as required to maintain the normal rate of production of the erythrocytes. The present conclusions concerning the etiology of these conditions, is that they are due to an interruption of one or more steps in this process which normally controls the continuous and orderly development of the erythrocytes.

#### ETIOLOGY OF PERNICIOUS ANEMIA

The recent productive investigations of the etiological factors producing the syndrome of pernicious anemia was largely responsible for our present concept of the causes of the macrocytic anemias. The etiology of this disease remained shrouded in mystery for approximately three quarters of a century after it was originally described by Thomas Addison in 1849. The discovery of Minot and Murphy<sup>7</sup> in 1926 that liver possessed the singular property of controlling an otherwise uniformly fatal disease, followed soon thereafter by the experimental studies of William B. Castle and his collaborators<sup>8</sup> bearing on its cause, comprise one of the most brilliant chapters in the history of hematology. These contributions laid the foundation for an understanding of the etiology and

treatment of pernicious anemia and the allied macrocytic anemias.

The most acceptable view of the cause of the anemia of pernicious anemia is that it arises from a decreased rate of production of red blood cells as a consequence of a diminished amount of the erythrocyte maturing factor. All evidence demonstrates, as Castle has shown,<sup>8</sup> that this arises from an inability of the gastric glands to secrete an adequate amount of the intrinsic factor. Consequently, with a defect in one of the essential steps, the erythrocyte maturing factor which is the end product of this process, becomes deficient and a retardation of maturation of the red blood cells in the bone marrow results. Since the red blood cells do not mature at a normal rate, they are delivered to the circulating blood in diminished numbers. When this circumstance prevails, an anemia will invariably result as blood destruction undoubtedly continues at a normal or possibly an accelerated pace.

Although this theory has received wide acceptance, the reason for the decreased functional activity of the gastric glands which are the source of the intrinsic factor is not known. As Meulengracht<sup>9</sup> has emphasized, however, there is clinical evidence which strongly suggests that there is a hereditary defect in the glands of the stomach and duodenum.

#### LESIONS IN THE NERVOUS SYSTEM IN PERNICIOUS ANEMIA

Pernicious anemia is characterized not only by alterations in the blood but also in a great majority of cases by a degenerative process in the nervous system. This change is refractory to treatment, or at least is much less responsive than the anemia, and at present constitutes the major therapeutic problem of the disease. The process characteristically involves the peripheral nerves and the posterior and lateral

columns of the spinal cord. The former causes paresthesia of the hands and feet, and the latter, when advanced, produces the clinical syndrome of a spastic, ataxic paraplegia. The cause of the nervous system involvement is as obscure as the etiology of the anemia has been, and at present is less understood. Recently Henry Field, Jr.,<sup>10</sup> has made the suggestion that this might be the result of a vitamin B<sub>1</sub> deficiency. The basis for this explanation lies in the observation of Castle, *et al.*<sup>11</sup> that a diet deficient in vitamin B<sub>1</sub> will produce alterations in the spinal cord of dogs which are similar to those observed in pernicious anemia. Although the diet ingested by patients with this disease is usually not grossly deficient in this substance, there is evidence, according to Field, that the achlorhydria which is uniformly present in patients with the syndrome, impairs the absorption of this material. It is thus conceivable that the suboptimal absorption of some component of this vitamin complex over a period of years, due both to the achlorhydria and a low dietary intake, may be responsible for the neurological changes. This tentative view is now being subjected to a careful experimental study at the Simpson Memorial Institute.

#### OTHER MACROCYTIC ANEMIAS

In addition to pernicious anemia, it is believed that similar anemias may result from a disturbance in the process leading to the elaboration of the erythrocyte maturing factor. It is possible that an inadequate amount of the extrinsic factor in the diet may be responsible for this, in the so-called "tropical anemia," in the macrocytic anemia of pregnancy, and also to a certain extent in some cases of pernicious anemia.

Complete gastrectomy and extensive infiltrating destructive lesions of the stomach are also recognized as causes

of such an anemia. The obvious implication is that the source of the intrinsic factor is destroyed. Furthermore, it has been known for many years that various intestinal lesions may be associated with a macrocytic anemia. In short-circuiting operations of the intestines, the generally accepted theory at present is that there is a faulty absorption of the erythrocyte maturing factor. In intestinal strictures the explanation is less apparent, but it has been assumed that such a lesion likewise interferes with the normal rate of absorption of this substance. In more recent years it has been stated<sup>12</sup> that extensive damage to the liver, when present over a sufficient period of time, will cause such an anemia. The explanation advanced is that there is an interference with the normal storage of the erythrocyte maturing factor in this organ. Even more recently it has been suggested<sup>13</sup> that a macrocytic anemia may arise due to the inability of the bone marrow to utilize the normally produced erythrocyte maturing factor (achrestic anemia). That such a cause might produce an anemia cannot be denied, but its final acceptance must be held in abeyance pending additional studies.

#### REFERENCES

1. Davidson, L. S. P., Fullerton, H. W., and Campbell, R. M. Nutritional Iron Deficiency Anemia with Special Reference to Prevalence and Age and Sex Incidence. *Brit. M. J.*, 2:195, 1935.
2. MacKay, H. M. M. Hemoglobin Level Among London Mothers of Hospital Class and Its Probable Bearing on Susceptibility to Infection. *Lancet*, 1:1431, 1935.
3. Heath, C. W., and Patek, A. J. The Anemia of Iron Deficiency. *Medicine*, 16:267, 1937.
4. Bethell, F. H., Gardiner, S. H., and MacKinnon, F. The Influence of Iron and Diet on the Blood in Pregnancy. *Ann. Int. Med.*, 13:91, 1939.
5. Bethell, F. H. The Blood Changes in Normal Pregnancy and Their Relation to the Iron and Protein Supplied by the Diet. *J.A.M.A.*, 107:564, 1936.
6. Meulengracht, E. The Presence of the Anti-anemic Factor in Preparations of Dried Stomach Substance from the Cardia, Fundus and Pylorus Respectively. *Acta med. Scandinav.*, 82:352, 1934; *Ibid.*, 85:50, 1935; *Ibid.*, 85:79, 1935.
7. Minot, G. R., and Murphy, W. P. Treatment

of Pernicious Anemia by a Special Diet. *J.A.M.A.*, 87:470, 1926.

8. Castle, W. B. The Etiology of Pernicious and Related Macrocytic Anemias. *Science*, 82:159, 1935.

9. Meulengracht, E. Some Etiological Factors in Pernicious Anemia. Univ. Wisconsin, *Symposium on Blood*, 1937, pp. 72.

10. Field, H., Jr., Robinson, W. D., and Melnick, D. Vitamins in Peptic Ulcer. *Ann. Int. Med.* (In press.)

11. Gildea, E. F., Kattwinkel, E. E., and Castle, William B. Experimental Combined System Disease.

*New England J. Med.*, 202:523-527 (Mar. 13), 1930.

12. (a) Goldhamer, S. Milton, Isaacs, Raphael, and Sturgis, Cyrus C. The Rôle of the Liver in Hematopoiesis. *Am. J. M. Sc.*, 188:193 (Aug.), 1934.

(b) Goldhamer, S. Milton. Liver Extract Therapy in Cirrhosis of the Liver. *Arch. Int. Med.*, 53:54 (Jan.), 1934.

13. Israels, M. C. G., and Wilkinson, J. F. Achrestic Anemia. *Quart. J. Med.*, 5:69-103 (Jan.), 1936.

# Engineering Services in Industry Other than Control of Occupational Diseases\*

JOEL I. CONNOLLY, F.A.P.H.A.

*Assistant to the President, Board of Health, Chicago, Ill.*

ENGINEERING services for the protection of life and health in industries have been extensively used in the promotion of safety, and today the place of the safety engineer is recognized because the results of his work have proved valuable. Engineering services are given to the plant physician for the purpose of aiding him in the prevention and removal of toxic substances which would otherwise cause poisoning of workmen, or for occupational disease. Besides these two well defined fields of engineering activity, there are others in which the engineer can be useful.

For the purposes of workmen's compensation, a rather sharp differentiation is made between industrial health hazards due to conditions affecting workmen immediately engaged in specific processes and those affecting fellow workmen in industry, the neighbors of industry, and frequently the customers of industry. Neighbors are most often affected by nuisances from odors, gases, dust, and trade wastes, which may constitute health hazards as well as nuisances.

Such matters related to the health of industrial employees as illumination,

glare, noise, vibration, safety of water supply, the temperature, humidity and movement of air, smoke, housing, recreational facilities, and city planning are largely engineering in nature. Close coöperation between medical and engineering personnel is very important in determining what conditions are or may become deleterious to health, without necessarily causing specific occupational diseases, and then, too, in carrying out appropriate measures to correct those conditions.

Much that is now more or less taken for granted was not always so. Early in the industrial revolution that initiated the factory system in place of the small shops and home crafts, abuses occurred both with respect to conditions of work and long hours of employment for men, women, and children. Before the passage of restrictive legislation, it was not uncommon to find that workers were required to oil moving machinery and operate it while eating their meals. Child operators, bound over as apprentices, were frequently housed in factory attics, one 12 hour shift going to beds still warm from their use by another shift. Respiratory illnesses were common under such adverse living conditions. Fatigue wore out workers early in life, with attendant unemployment at a period of life when they should

\* Read at a Joint Session of the Engineering and Industrial Hygiene Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

have been most useful to themselves, their families, and society. Great as has been the improvement since then as the result of a more humane attitude, sanitary and labor legislation, and intelligent self interest of industrialists, there remains much to be done which involves the application of engineering methods and materials.

#### ILLUMINATION

Adequate light has two principal advantages: (1) More and better work can be accomplished with less fatigue and less danger to vision. (2) Dirt and obstacles over which one may trip become more noticeable and therefore more likely to be removed.

The intensity of light should be adapted to the character of the work being performed; the finer the work, the higher the degree of illumination needed. High intensity given by local sources of light at the spots where fine work is being done may well be coupled with a lower level of general illumination throughout the work space. The latter level should be high enough to reveal hazards such as dark colored objects on the floor, so that a worker turning quickly from the high intensity at his machine or bench will not have difficulty in seeing them and thereby avoiding falls.

Factors such as rates of dark adaptation of the eyes of workers and the relationship of vitamin A deficiencies thereto enter into this question of illumination and emphasize the need for coöperation between the engineer and the industrial physician.

Use of light poor in red rays, such as that of mercury vapor lamps, may have an undesirable psychological effect upon workers, particularly women, because of the unnatural appearance of persons seen in such light. Mixture of light containing red and yellow rays with the bluish light is desirable, even though the latter gives sufficient intensity alone.

Arrangements of incandescent lights and mercury vapor lights together in a work space are frequently used for this purpose.

Investigations have indicated that raising the intensity of illumination has increased the rapidity and accuracy of work by from 10 to 15 per cent, and reduced eye strain, fatigue and consequent headache, and possible serious eye defects.

There is a difference of opinion as to the intensity needed for the performance of certain kinds of work. For example, estimates for that necessary for reading vary from 10 foot candles for reading ordinary black type on good quality paper, to as much as 30 or even more for reading fine type on poor quality paper.

#### PREVENTION OF GLARE

Diffused lighting is desirable. Bright non-shaded sources of light are causes of glare and should be replaced by diffuse sources or surrounded with suitable shades. Glare reduces visual acuity and causes discomfort. It promotes accidents, due to the longer time necessary for dark adaptation of the eye that has been subjected to glare. The intensity of the light on the work should not exceed ten times that of the light on the surrounding objects if accidents, due to this cause, are to be prevented. The glazing of paper with which one works is an appreciable factor in glare. Prevention must take into account both the nature of the light source and the materials used by the worker.

#### NOISE

Noise may be considered under two main heads: (1) noise from legitimate industrial activities, and (2) disturbances of the peace by unnecessary use of automobile horns and the like.

The latter is a matter generally felt to be a responsibility of the police de-

partment. The former type of noise emanating from legitimate industry may be tolerated during the day but objected to if it continues at night, when it interferes with the sleep of neighboring residents.

Frequently noise can be prevented at the source by better design of machinery. Generally a noisy machine is an inefficient one. Noise not eliminated by improvements in machinery may be absorbed by suitable acoustic materials properly placed. Sometimes a wall or floor of a structure acts as a sounding board to amplify the noise, but effects of this kind may be minimized by use of foundations that do not transmit sound vibrations to the structure—another engineering problem.

Effects of noisy environments upon the sense of hearing, the nervous system, efficiency, and fatigue have been found by investigators amply to justify remedial measures. The recognition of this fact has resulted in recent years in a new industry, that of acoustic treatment and materials.

#### VIBRATION

Much complaint is made of vibration of too low frequency to cause noise. For example, a worker making lithographs or retouching photographs in a building constantly vibrating during working hours because of machinery elsewhere in the structure, is under a severe handicap. Vibrations may travel through the ground to nearby houses due to the operation of punch presses and similar heavy machinery, and are frequently the cause of complaints by neighbors of broken rest and structural damage. The correction of such conditions lies in the field of engineering, of which zoning or city planning is a part.

#### WATER SUPPLY

A court decision, recently reported, held that a water-borne disease contracted during the course of employ-

ment was not an industrial accident and therefore not compensable under the law of that state. There may be some question whether it constitutes an occupational disease. Many outbreaks of water-borne disease or illness have been traced to the contamination of drinking water in factories either by cross-connections of a safe with an unsafe supply or by interconnections of a safe water supply with a sewer or other container of contaminated liquids. The contaminant may be human excreta or industrial wastes of toxic character.

In new buildings, the occurrence of a hazardous situation which permits such illness to occur can in part be prevented by requiring the approval of plans for the plumbing system and industrial water piping system by a competent public health engineer, coupled with adequate inspection to assure that no deviation from the approved plans occurs. Since this step does not prevent the subsequently installation of cross-connections and interconnections, periodic reinspections should be made, as a further safeguard. Identification of piping systems by suitable colors is helpful in preventing the accidental making of cross-connections, but education and a real sense of responsibility are needed to prevent intentional creation of these hazards.

Air washers and scrubbers used in connection with spray booths frequently are found to have interconnections which, under conditions of reduced pressure in the water mains, permit toxic substances to enter the drinking water supply. Vats and tanks of chemicals may be hazards. In one instance coming to the writer's attention, a tank containing potassium cyanide solution was discovered to have a submerged water inlet through which siphonage of this deadly poison into the drinking water supply of a large building could occur. Fortunately the danger of the situation was discovered and imme-

diately remedied before anyone was poisoned. The industrial engineer who designs and operates a plant, the physician who guards the health of the employees, the fire underwriters, the water department, and the health department need to work harmoniously together if new hazards to drinking water supplies of workers are to be prevented and existing ones discovered and eliminated. The safe disposal of liquid wastes, containing pathogenic bacteria, poisonous chemicals, or toxic volatile substances is an engineering problem of great complexity.

#### AIR TEMPERATURE, HUMIDITY, AND MOTION

Since activity of the body entails combustion of food and the production of heat, it becomes necessary to dissipate body heat to prevent an increase in temperature. This is done in part by evaporation of water from skin and lungs, and in part by radiation, convection, and conduction, which processes are affected by the temperature of surrounding surfaces, kind and amount of clothing worn, and the temperature, humidity, and motion of the air. Less than 10 per cent of the heat is lost in other ways.

Many cities have ordinances requiring that provisions be made for ventilating factories and workshops and setting up minimum standards which must be met. Some processes entail the use of high temperatures and the expenditure of much muscular energy, as for example around blast furnaces and foundries. Workers there are frequently exposed to great extremes of heat and cold over short intervals of time. Profuse perspiration depletes not alone the water but also the stores of salt in the body, causing severe cramps of muscles of the limbs and abdominal wall (stoker's or miner's cramp) unless the intake of salt is increased to compensate. In industries where such con-

ditions exist, salt tablets are dispensed to the men, often adjacent to drinking fountains, and education of the workers as to their need for the salt tablets is undertaken.

Heat stroke is attributed by students of the phenomenon to the exhaustion or inadequacy of the heat dissipating mechanisms as a result of exposure to a hot, humid atmosphere. It may seriously damage nervous tissues and cause death. Sunstroke is a form of heat stroke in which there is also the absorption of solar radiant energy in addition to the effect of high atmospheric temperature.

Comfort of workers has an effect upon the mental attitudes they adopt. Their mental health may be affected to some degree by the atmospheric conditions in which they labor. To promote their mental well-being, temperature of the air should be adjusted to the kind of work. Office workers seated at desks may require a considerably higher air temperature for comfort than men doing hard muscular labor.

The provision and maintenance of ventilating and air conditioning equipment is the function of the engineer, in addition to the provision of local exhaust ventilating systems for the removal of toxic materials at their point of origin. The latter is not within the realm of this discussion, however, as it deals more intimately with the prevention of occupational diseases.

It is not enough for public authorities to enact legislation requiring the building of suitable means for ventilation of places of employment. In order fully to discharge its duty, the public body should undertake to assure that the equipment is used, or at least is capable of being used. The burning out of a motor, the improper adjustment of dampers and splits in ducts, the rusting away of parts of ducts, the covering of an intake opening, and many other things occurring accidentally or

otherwise, may impair or destroy the usefulness of the system. Annual inspections should be made of all mechanical ventilating equipment which is required by law to be installed, to insure that it is possible to operate it and deliver the proper amount of air to the work spaces when it is required by the workers.

Incidentally, on the occasion of these annual inspections, the inspector has an opportunity to note conditions favoring occupational diseases and suggest means for their amelioration. Sometimes workers suffering the ill effects of such conditions either do not suspect the cause of their illness or discomfort or are afraid to complain lest they lose their jobs.

#### SMOKE CONTROL AND ABATEMENT

The presence of dense smoke in the atmosphere greatly diminishes the amount of ultra-violet light in sunshine reaching the ground, especially during the period when the sun does not approach close to the zenith. The beneficial effect of short wave lengths of light upon health, particularly in such conditions as rickets, is too well known to require emphasis here.

Smoke prevention is essentially an engineering problem, involving the maintenance of sufficiently high temperatures and enough oxygen to secure complete combustion. Proper design of boilers and heating plants, coupled with education of those in charge of them, has proved effective in numerous places where a serious effort has been made in this direction.

#### HOUSING

It is impossible to separate completely the effect upon a worker's health of the conditions away from work from those at his place of employment. He is affected by both environments. If while at work he is exposed to toxic substances, his hours away from work

should be spent in an environment conducive to neutralizing such of these as have been absorbed. Those persons suffering from chronic ailments, possibly as a result of unhygienic living conditions at home or bad health habits, are known to be poor risks when toxic materials must be encountered in their work, due to (1) lowered resistance, (2) carelessness or inability to take precautions.

When a worker, fatigued after a day's work and possibly suffering from exposure to some occupational hazard during the day, reaches his home, it should be possible for him to relax. Overcrowding, with its concomitant close personal contacts, is not conducive to relaxation and recuperation in preparation for the days that lie ahead. In planning and building more hygienic housing, the engineer has his part. He may well devote careful attention to the *Basic Principles of Healthful Housing* prepared by the Committee on the Hygiene of Housing of this Association.

#### RECREATION

Mental hygienists aver that mental disease is one of the principal causes of absenteeism from industries, both in this country and abroad. Both housing and facilities for recreation have definitely recognizable influences upon mental health, and therefore should be matters of concern both to employers and employees, in addition, of course, to the engineer and industrial physician. The trend toward shorter hours of labor lends point to the need for adequate city planning to provide open spaces and equipment for health promoting recreation.

#### CLEANLINESS

The public health engineer must concern himself as well with such activities as are frequently placed in the category of esthetic effects—good housekeeping being an example. A plant should be designed with a view to producing



pleasant surroundings with a minimum of effort and, as a means to this end, have smooth, light colored walls, and impervious floors. Cleanliness of surroundings helps the plant physician to produce among workers in industry those habits and attitudes that will lead to care in the handling of toxic substances and dangerous equipment and promote good health.

Cleanliness applies not only to removal of visible dirt, but also the invisible microorganisms which may spread disease. Although colds are not usually considered to be occupational diseases, they rank high among causes of lost time. Therefore, steps for reducing the incidence of colds are warranted. Sterilization of dishes and eating utensils, use of approved types of drinking fountains which comply with the essential features in the design of such fountains adopted several years ago by this Association, or paper cups, and the provisions of satisfactory wash-rooms, locker facilities, and eating places, separate from spaces where toxic materials are present, are important

aids toward better health. Lockers should be ventilated so that damp clothing placed in them may dry.

#### HEALTH EDUCATION

Finally, the engineer is in a favorable position to help educate the workers in the intelligent use of the safeguards that his skill provides for their protection. The attitude of disdain or indifference on the part of employees that was sometimes encountered by the safety engineer has now largely been changed to one of respect and coöperation, as the workmen have seen how accidents have been reduced. Since "the proof of the pudding is in the eating," the enhancement of health through the various means at the disposal of the engineer, working in harmonious coöperation with medical and nursing personnel of a plant, develops confidence in his knowledge. This increases his value in promoting health education among the workers, with resulting improvement in their health knowledge, health attitudes, health behavior, and health status.

# Use of Existing Visiting Nurse Services for Industrial Work in Small Plants\*

RUTH W. HUBBARD, R.N.

*General Director, The Visiting Nurse Society of Philadelphia, Philadelphia, Pa.*

TODAY medical departments in industry are increasingly becoming industrial hygiene divisions rather than first aid dispensaries. Since the aim of industrial hygiene is to promote and preserve the health of the worker, while first aid implies the immediate and restricted assistance following a catastrophe or accident, the change in breadth of service and interest is evident to even the most casual observer. The manner in which this change has come to pass is not part of our discussion. We are concerned rather with its effect on industrial health programs, and in particular on the programs in small plants.

We now know that industrial accidents and industrial diseases, whose prevention was the aim of the early plant dispensaries, are not responsible for the greatest amount of time lost by workers. In fact, ill health is the cause of at least 15 times as much absence.<sup>1</sup> To industry, absence from whatever cause is expensive and upsetting. To the worker, loss of time, because of an illness which could have been prevented, is especially futile. Therefore, when management and workers alike under-

stand the value of industrial hygiene, positive support is forthcoming. A good industrial health program does pay.<sup>2</sup> The larger manufacturers, convinced of the soundness of such an investment, have quite generally installed industrial hygiene departments. They have developed programs which include not only accident control and prevention, but also health promotion as provided in preemployment physical examination, correction of defects, provision for hygienic as well as safe working conditions, and health education for all workers. The results in the reduction of lost time due to illnesses and accidents have been revealing and satisfactory. The worker likewise has felt the benefit of this broader approach to industrial hygiene as he realized earlier the benefits of legal provision for compensation for industrial accident and disease.

There is, however, work to be done in applying this type of activity to the small plant. Since 62 per cent of the 8,000,000 and more persons employed in manufacturing plants in this country are in plants with less than 500 employees,<sup>3</sup> it is worth while to consider some of the problems which confront the small manufacturer who wishes to develop a health service. He does not need to employ a full-time physician

\* Read at a Joint Session of the Industrial Hygiene and Public Health Nursing Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 10, 1940.

and nurse. He can develop his safety committee and his plant first aid staff, but in the matter of professional help he may have difficulty. The American Medical Association, through its Council on Industrial Health, is working on this problem, and the National Association of Manufacturers, through its Committee on Healthful Working Conditions, is endeavoring to give practical assistance to small plants in establishing departments.<sup>4</sup> Various arrangements for nursing service have been tried and have met with success in different places.

The experiment with which I have had experience involves the use of staff nurses from a Visiting Nurse Association on an appointment basis in plant dispensaries. Visiting Nurse Associations were organized primarily to give part-time service, originally, it is true, in homes, but more recently they have been found in schools, clinics, and industries. While many people still think of visiting nurses as available for one section of society only, they are increasingly sought by persons quite able to pay regular fees but needing only part-time care. Therefore, the plant which needs and wishes to pay for part-time nursing service may properly turn to its local public health nursing organization. These organizations are established upon certain fundamental principles. The nurse meets a standard in her professional preparation; she works under the supervision of a qualified person; she gives care to patients always under the medical direction of a physician; she uses the existing community resources for her patient wherever possible; and she is as much concerned in having her patient learn to prevent illness as she is in helping him recover from the present difficulty. All of these things are essential in a good industrial program.

So much, then, for her readiness for this piece of work. You are probably

interested in knowing what she is called upon to do in a plant and how she does it. The National Organization for Public Health Nursing reports that out of 210 nonofficial agencies who returned reviews of their 1939 activities, 27 are engaged in some form of industrial work. In this group a variety of participation is evident. While approximately half give plant service, and three-fourths visit in employees' homes, only one-fourth do both. The income to the agency, the basis for setting the charge, and the yearly volume of service vary widely. Apparently we are all experimenting here as we are in programs within the plant.<sup>5</sup>

The Visiting Nurse Society of Philadelphia has had but 8 years of experience in this field. The 5 industries we serve have had dispensaries (in most cases) for 14 years. Prior to our participation 4 of them were served on the unit, or team system by one physician and by a nurse who divided her time among several small plants conveniently located. We, therefore, had the advantage of a group of people accustomed to a part-time industrial hygiene program.

It was further our good fortune to undertake the work under the medical direction of an industrial physician. His readiness to develop the medical departments in 4 of his plants with visiting nurse service, and his experience in the problems of industrial hygiene have contributed in no small measure to our progress in this field. More recently a 5th plant, with another physician, has been added to our group. Under no circumstances could the programs discussed here be carried on without a medical director.

Obviously the plant wishes the nurse available when the employees are there. On the other hand, they cannot be interrupted at certain crucial moments in their work in order to go to the dispensary. The other side of the pic-

ture is the problem of the visiting nurse whose day can be more efficiently used if it is not broken into by frequent short appointments. We have gradually worked out a system which seems to give satisfaction. The nurse is usually in the plant at the beginning or the end of the morning or afternoon. She tries to space her time to supplement that of the physician so that one of them is in each plant daily. Wherever possible she gives consecutive time rather than two appointments a day to a plant. The time at which the nurse is in the plant is almost as important as the total number of hours she gives.

The Society made its business arrangements directly with the plant management, offering nursing service by appointment at an hourly rate. Earlier experimenters took the position that a plant needed 2 hours weekly of nursing time per 100 employees. We soon learned that the type of plant activity and personnel affected this estimate greatly. An office population may be adequately served on this basis, but a packing plant with the possibility of more frequent minor injuries and resultant surgical dressings may need twice as much time. The plants very properly wanted to have their own nurse, not a succession of different people. This was assured them, and has been consistently followed, with gratifying results. The nurse is a regular member of the plant personnel during her time there and uses the Visiting Nurse Society as a separate community resource for her plant patients when necessary. However, in order to insure continuous service to the plant, each nurse has a substitute or understudy who is familiar with the plant program and is available to relieve the regular nurse for absence or illness. This we believe to be essential for a reliable service to industry.

The hourly charge is based on the nurse's salary, vacation relief, super-

vision, and transportation. Our agreement with each plant specifies the amount and kind of nursing service to be rendered, and the hourly cost. All bills are submitted monthly. Changes in time arrangements are made after consultation between the physician, the plant, and the Visiting Nurse Society, and are, of course, based on demonstrated need.

The program under the direction of the physicians in our plants has expanded encouragingly. Preemployment physical examinations, annual or biennial examinations, follow-up for corrections, safety promotion, plant hygiene, and general health education form the basis of our work in each plant. The variations are due to type and size of industry, age and sex of workers, and adequacy of medical and nursing time available.

In 2 plants preemployment physical examinations are made, one of which includes a routine Wassermann test. In the other 3 plants physical examinations take place as soon as possible following appointment. It is the aim of the physician to give each worker an annual health examination. Time has permitted this in but one of the 5 plants. The nurse is responsible for assisting the workers to carry out recommendations made at these examinations. This frequently involves conferences with private physicians or outside agencies, and here the familiarity of the public health nurse with her community resources proves to be a decided asset. It is not unusual to find the financial obstacle the chief one to the correction of defects, and several of the plants have established loan funds which are made available so that corrective dental work or glasses can be procured promptly. Return payments are then made weekly by the employee.

A further responsibility of the nurse is that of being familiar with the plant and the workers as they carry out their

several processes. We have found it valuable to take time to visit the departments with some regularity, and to be familiar with the general tempo of the work in the sections of the plant. The relationship of illness to activity has several times been rather clearly shown when monthly reports have been studied with the set-up of the department in mind. In one plant a group of young women in a packing department showed an unusually high incidence of gastrointestinal difficulties. Study of their work, their lunch period, and their choice of foods at the plant cafeteria resulted in consultation with our nutrition worker and the plant manager. Following this, some menu changes as well as relief periods have been developed, and we are noticing a gratifying diminution of the symptoms. At the same time the nutrition consultant and the nurse have arranged for brief conferences with the girls in this department on food selection and normal diet.

The frequent appearance of the nurse in the plant does give the workers a sense of her familiarity with their problems, and also perhaps furthers their readiness to talk with her. Recently an older employee stopped the nurse as she made her way through his department and talked to her about a problem which had been concerning him for some time. He feared dismissal because he was reaching what he anticipated might be an age limit. The suggestion of the nurse that he ask for complete physical examination, his confidence in the doctor which enabled him to accept the suggestion, and the report of his general good health to the manager, resulted in a distinct relief of his anxiety. The worker and the manager talked over the whole situation with the result that he was assured of employment, a yearly physical examination, and the prospect of some change in his load when that was indicated. His anxiety had apparently arisen within

himself since the manager had no question of his ability and of his value to the plant.

In the small industries in which we give service the safety programs have been rather informally organized. At present the physician and the nurse do not sit regularly on safety committees, but this is a procedure which we all recognize as desirable, and we are working toward it. Here again, the nurse who is familiar with the safety devices provided and their manner of use can often throw her influence on the side of their adoption by the workers. In one plant which has a rather high accident rate we have found the influence of the nurse to be effective with some workers who were inclined "not to bother" to wear knife guards in a cutting process. The return of an individual to the dispensary with repeated lacerations gave the nurse an opportunity to do some much needed education on the importance of coöperating with the safety plan of the plant.

Perhaps one of the most obvious values of the use of a public health nursing staff in a small plant is her familiarity with the community. A report made before the Association a year ago of the work of industrial nurses in a large city in Pennsylvania, pointed out that the industrial nurse often works quite alone without the benefit of close relationship to community agencies. This may be due to lack of information rather than to failure of interest on her part. From the moment that she enters a Visiting Nurse Association, the public health nurse thinks in terms of community resources for assisting in the solution of her families' problems. Therefore she is in a position to be of practical assistance about medical or nursing attention at home, convalescent care, hospital care, temporary child placement, or recreational opportunities. Our plants all have close working relationships with a neighborhood hospital

for emergency treatment, and with the health department for laboratory work.

Recently a young woman in one of our plants discussed her approaching marriage with the plant nurse. Her discussion led to the nurse's suggestion, with the physician's approval, that she and her prospective husband might like to consult the Marriage Counsel for help with their plans. They did this and reported back to the plant dispensary their satisfaction with the assistance they had received from the Counsel.

The middle aged woman in one plant, who went to a seaside convalescent home for her first holiday in many years, following the death of her mother, is another illustration of the recognition on the part of the industrial hygiene department of the value of "preventive sick leave." In this instance the worker's colleagues were particularly interested in her welfare, and it was they who brought to the attention of the dispensary staff the difficult time which the individual was having. The arrangements for the unexpected holiday, and help in the selection of the place to which she might go, were made through the dispensary staff.

One ever present problem in a part-time service for a plant is that of coverage in the absence of the doctor and nurse. In the plants in which we are active different systems have been developed. Certain non-hazardous industries find scant need of any dispensary service except at the stated intervals provided. However, in 3 plants, 2 of which are on a 16 hour schedule, there is need of someone prepared at least to give first aid. First aid boxes, which are the responsibility of the nurse, are available in each department, and each plant has one person available for accidents, who has been instructed by the physician and the nurse. Very careful instructions as to the procedure in the event of serious accident are posted in all plant dispensaries. The relief or

first aid individual usually has a post of duty near the dispensary, and is on duty when the dispensary staff is away. There is distinct need, we feel, for more adequate provision for this kind of service by management. Wherever such a person is used, he or she must be carefully prepared for the work.

This presentation of the type of activity in a small industrial dispensary, in which I have described the nurse's work, will give you some appreciation of the importance of the qualifications of the nurse.<sup>6</sup> The Visiting Nurse Society realized in the beginning that the nurse who undertook industrial nursing needed to be a mature and experienced person, with a successful record in human relationship. Whenever the selection of a new nurse comes up, and plans are being discussed with the plant physician, his inevitable comment is, "Well, you see, we need a particular kind of person for industry." The definition of "particular kind" is a bit obscure, but I presume it is much the same as that we imply when we say of an individual, "She is a really good public health nurse." We accept the validity of the statement of the industrial physician. The successful nurse regards her relationship to her responsibilities in the plant as she does her work in her district and with her families. She endeavors to understand the needs of the individual workers so that she may be practical in her counsel and help them to meet their problems.

The qualifications are those for staff appointment in the Society, plus the previously indicated successful experience on the staff. The new nurse then spends several weeks in the plant, if possible, with her predecessor, and always under the direction of the member of our supervisory group who heads the industrial program. If she is used only for relief of the regular nurse, she has a similar introduction, and visits the plant regularly in order to be known

there and to be familiar with daily activities. This is vital to successful relief.

Very early in our participation in this work we felt the need of a supervisor in our own group who would act as a liaison person between the Society, the plant physicians, and the plants themselves. We therefore chose a member of our supervisory group who carries this work. It consumes approximately one-third of her time. She is responsible for the daily progress of the work in all the plants. In addition to assisting in the selection of plant nurses and carrying out their introductory programs, she is also responsible for their continuous staff education. We hold monthly conferences with the plant physician, the industrial nurses and their general supervisors at the Society's office. Much of the work of standardizing dispensary procedure, the establishment of standing orders, plant policies, and the development of new programs has been begun and thought through in these conferences.

Formal preparation for nurses in industry is recognized as essential in our graduate programs in public health nursing today. We are fully aware of the vital need for preparation and are working toward it with our own group through the Department of Nursing Education at the University of Pennsylvania. Meanwhile, we have found it helpful to use every available opportunity for attendance at conferences and meetings of such organizations as this and the National Safety Council. Likewise, members of our group have studied industrial programs in our own community and in other cities. Each contact has strengthened our own work.

The problems which have confronted our agency in this work are typical. Probably the outstanding one has been the provision of an adequate amount of nursing time to insure an all-round health program. The concept of the

program held by the physician and management influences this. The industry which conceives of its plant dispensary as entirely a first aid station needs a larger concept of the possibilities of this department before it is willing to purchase additional time. No stock rule seems to us sound. The plant with few hazards can have a successful program at smaller cost per employee than its neighbor. Likewise, the type of employee influences the amount of time needed. A long list of factors which affect this matter can be given. It seems sensible to begin with a reasonable amount of time, which could be estimated at 2 to 4 hours of nursing time per week per 100 employees. Experience will teach the department how much time it needs to achieve its goal and, if management has not crystallized its idea of maximum time in the experiment, future enlargements or curtailments can be made. However, changes in procedure of this kind are not made readily in any busy organization, and therefore should not be contemplated on too brief an experience.

The primary objective of any manufacturing plant is the production of goods and their sale. The health of the workers, while of fundamental importance, cannot daily take first place in plant activities. The industrial physician and nurse need to develop effective ways in which to keep management in touch with and aware of their work and the productive results. The regular statistical report can be constructed so that it points up both progress and problems. Conferences, though they cannot be frequent, are often the best way in which to bring to the attention of the employer the problems which are confronting the dispensary. It has been our experience that, whenever a really important matter concerned us in the plant, our access to management was immediate and action was forth-

coming. We have learned, however, to tell our story in a different way to the business man from that told to the board member. It has been good experience for us.

No piece of work is safely done without an adequate record. Therefore, an individual record of each employee is fundamental. Also, a record of progress in the follow-up of physical examinations is essential. One of our problems has been to have time for this record work. The statistical office of the Society takes full responsibility for the analysis of monthly statistics, but the detail of record work in the plants themselves is borne by the nurse. In one plant we have been able to secure clerical assistance, which has relieved the nurse for her own professional function.

The work of the Society in this field has been confined largely to the mastery of a sound industrial nursing service on a part-time basis. We are now convinced that a visiting nurse association can offer a plant a satisfactory service. It would seem to us that the next step lies in the field of promotion. We know that local county medical associations are developing industrial hygiene committees which undertake to prepare physicians for industrial work as the demand arises. It is our feeling that local chambers of commerce, divisions of industrial hygiene in departments of health, and safety councils, may also be resources in this realm.

The public health nurse has been welcomed to an intimate place in the structure of our national health program because of her readiness to give skilled assistance and her ability to adapt herself to changing conditions. Repeatedly health problems have been solved when those responsible have introduced her

into the situation. The experience of one agency presented here is too restricted to justify broad assumptions, but it has been developed upon the principles of public health nursing in kindred fields, and the results thus far are encouraging. Since the healthy worker is a tangible asset to industry as well as to society, and the industrial hygiene department is a factor in maintaining that health, it is reasonable to assume that all workers should have the benefit of such service. However, as so great a proportion of the workers engaged in manufacturing processes are in small plants, programs must be devised for them, offering part-time medical and nursing service. These industries are scattered throughout our country, as are also public health nursing associations created for visiting or part-time nursing and health services. Therefore, it should be practically possible to repeat our experience under a variety of circumstances, and we anticipate that further experimentation between plant medical departments and visiting nurse associations will be forthcoming.

#### REFERENCES

1. Parran, Thomas, M.D. The Nurse in Industry. *Pub. Health Nurs.*, 30:561-562 (Oct.), 1938.
2. National Association of Manufacturers, Division of Industrial Health, New York, N. Y. *Who's Too Small for a Health Program?*
3. Bloomfield, J. J. The Nurse and Industrial Hygiene, Part II. *Pub. Health Nurs.*, 30:648-654 (Nov.), 1938.
4. Shafer, Donald M. Improving the Health of the Worker. *Pub. Health Nurs.*, 31:677-681 (Dec.), 1939.
5. Houlton, Ruth. Nursing Service for the Small Plant. *Pub. Health Nurs.*, 31:515-517 (Sept.), 1939.
6. Desirable Qualifications of Nurses Appointed to Public Health Nursing Positions in Industry. *A.J.P.H.*, 29:789-790 (July), 1939.
7. Bloomfield, J. J. Development of Industrial Hygiene in the United States. *A.J.P.H.*, 28:1388-1397 (Dec.), 1938.
8. Bloomfield, J. J. Industrial Hygiene—Retrospect and Prospect. *A.J.P.H.*, 29:1215-1224 (Nov.), 1939.
9. Newquist, M. N., M.D. Industrial Nursing—Past, Present, Future. *Pub. Health Nurs.*, 31:162-166 (Mar.), 1939.
10. Hodgson, V. H. *Public Health Nursing in Industry*. Macmillan, New York, 1933.



# Bacteriological Diagnosis of Pneumonia in Relation to Chemotherapy\*

COLIN M. MACLEOD, M.D., AND GEORGE S. MIRICK, M.D.

*Hospital of The Rockefeller Institute for Medical Research, New York, N. Y.*

THE introduction of various sulfonamide compounds has contributed greatly to the therapy of pneumonia. Important as this contribution is, it leaves unanswered the fundamental question—that of prevention. The development of therapeutic measures serves to emphasize the fact that the prophylaxis of pneumonia still remains an unsolved problem.

Cole has pointed out that lobar pneumonia is not a single disease but rather a group of diseases, each with a specific etiology. This point of view is as valid from the public health aspect as from that of therapy. It is well to remember that our ideas of the epidemiology and pathogenesis of pneumonia are far from complete and will remain so until further careful study and evaluation have been made of the various factors involved. The type incidence of pneumonia is as baffling a problem as ever; for example, why do infections due to Type I comprise approximately 30 per cent of all cases of pneumococcal pneumonia, or why are 80 per cent of all cases due to but 7 of the many specific types of pneumococci?<sup>1</sup> Knowledge of the factors which account for the selec-

tive incidence of these particular types will undoubtedly throw great light on the prophylaxis of this group of diseases. Until fuller knowledge of these factors has been gained it is necessary to study the problem from the standpoint of the type-specificity of the bacterial incitant.

The fact that pneumococci are usually secondary invaders in the wake of a non-bacterial upper respiratory infection such as the common cold, in no way detracts from the significance of the observation that Type I pneumococcus is the most important epidemic strain. It is equally significant that the epidemic strains are encountered infrequently in the normal throat except in individuals who have been in intimate contact with patients suffering from pneumonia due to one of these types. Furthermore, although the control of pneumonia may ultimately be achieved through prevention of the antecedent upper respiratory infection, this is as yet not possible. Meanwhile all precautions should be taken to prevent the spread of the epidemic strains of pneumococci. How this may be accomplished is far from clear, but intensive epidemiological studies offer an approach to the problem.

In addition to these general considerations, the bacteriological diagnosis of

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 10, 1940.

pneumonia has immediate practical importance from the point of view of therapy.

Upon the introduction of any new therapeutic agent there is a tendency to discard previous procedures or else minimize their importance. With the advent of sulfapyridine, the first effective antipneumococcal drug, it was considered by many that the use of specific antisera was outmoded, and that the much less exacting procedure of administering a sulfonamide drug by mouth to all cases of pneumonia, irrespective of the specific nature of the etiological agent, solved the problem of therapy. This point of view was based on inadequate clinical and experimental evidence, so that now opinion is gradually shifting back to a middle ground where the use of serum and the sulfonamide drugs may be more properly evaluated.

It is the opinion of most investigators that the therapeutic action of the sulfonamide drugs can be explained by their bacteriostatic properties. Fundamental as is this mechanism, it should be remembered that the disposal of the still living and virulent pneumococci is a function which can be performed only if the various defense mechanisms of the host are active. This point may be illustrated by reference to the chemotherapy of experimental pneumococcal infections with sulfapyridine.<sup>2</sup> If mice are infected with Type I pneumococcus and treated with sulfapyridine for 3 days, practically all of the animals survive. If treatment is carried out for 2 days, only 60 per cent of the animals survive, and if for only 1 day practically all of the mice die. It has been shown that approximately 3 days are necessary for the development of active immunity to pneumococcus Type I. Hence, in infected mice which are treated with the drug for only 1 or 2 days it is probable that the deaths which occur are attributable to the fact that the drug has been discontinued

before the animals have had sufficient time to develop specific immunity.

If for any reason the body is not able to develop antibodies rapidly enough to sensitize the invading bacteria, then even prolonged administration of the drug may not be effective in inducing recovery. This is illustrated in the case of experimental infections with pneumococcus Type III. Very few mice infected with this organism survive even though treated with sulfapyridine for a prolonged period, and it has been shown that it is difficult to induce active immunity in mice to pneumococcus Type III, whereas this is readily accomplished in the case of Type I.<sup>2</sup>

It appears likely that the differences in the antigenicity of pneumococcus Type I and Type III may explain the difference in the response to sulfapyridine in experimental infections with these two types. The differences in the antigenic behavior of pneumococcus Type I and Type III in mice are observed in human beings as well.<sup>3</sup> Due to this fact, as well as to the serious prognosis in Type III pneumonia, it is our practice to treat these patients with a combination of an appropriate sulfonamide compound and Type III antipneumococcus serum. A survey of the literature indicates that the case mortality rate in patients with Type III pneumonia, treated with sulfapyridine alone, is in the neighborhood of 17 per cent, whereas in a small series of patients which we have treated with a combination of serum and drug, the mortality rate has been only 4.3 per cent. From clinical experience as well as from experimental considerations we feel that the combined therapy with drug and serum offers much more promise than either agent alone in the treatment of Type III pneumonia.

The necessity for making a bacteriological diagnosis applies also to infections due to pneumococci other than

Type III, since here also the indications for the use of specific antisera are well defined. In addition to the sulfonamide drug, specific serum therapy should be used in all patients who are critically ill, in whom clinical examination indicates a prognosis of more than usual severity due to advanced age, the presence of complications, or bacteremia.

When a patient with pneumonia is first seen by a physician, it is frequently possible to state that the prognosis is fair or poor, as the case may be. Certain laboratory data will supplement the clinical impression, and one of the most important examinations is to determine whether or not bacteremia is present. In a large series of cases collected from various sources the mortality rate in bacteremic patients treated with sulfapyridine alone was 23 per cent, whereas in the non-bacteremic group the death rate was only 4.5 per cent. If one waits for information as to whether the blood culture is positive or negative, enough time may elapse for the intoxication to become so profound that no therapeutic measures will avail. For this reason a rapid bacteriological diagnosis by sputum examination as early as possible is of great importance, so that sulfonamide therapy may be supplemented by specific serum therapy when necessary.

Another group of cases in which the bacteriological diagnosis is important is that in which no response to chemotherapy is obtained even though the patient's condition is apparently favorable at the time treatment is begun, and in whom, despite adequate blood sulfonamide levels, the acute process remains active or becomes progressive. In the absence of complicating lesions, for example, empyema or some other purulent focus, lack of response may be due to sulfonamide-fastness of the invading pneumococcus. Susceptibility to the bacteriostatic action of the sulfonamide drugs varies somewhat in different

strains of pneumococci, even though contact with a particular drug has never occurred. Furthermore, fastness may develop during treatment, so that the organisms become resistant to the bacteriostatic action of the drug. It is fortunate, however, as we have shown,<sup>4</sup> that upon the acquisition of fastness the organisms do not lose their type-specific characteristics and are still fully susceptible to the therapeutic action of type-specific antipneumococcus serum.

It is of great interest that once sulfapyridine-fastness has developed in a strain of pneumococcus this characteristic is retained even though the organism is passed serially in many normal animals or in artificial culture media. Because of the persistence of acquired fastness, it is possible that the occurrence of localized epidemics due to drug resistant strains may appear. It is also well to remember that pneumococci which are fast to sulfapyridine are also fast to other sulfonamide derivatives, so that in order to treat patients suffering from infections due to fast strains, the sulfonamide drugs are of little avail, and use must be made of type-specific antiserum.

*In vitro* tests for the rapid and accurate determination of sulfonamide-fastness have not been practical up to the present, since the usual culture media contain varying amounts of substances which inhibit or annul the bacteriostatic action of the sulfonamide drugs. Inhibitors are present both in peptone<sup>5</sup> and in the meat infusions<sup>6</sup> used in the preparation of culture media. The importance of inhibitors of the sulfonamide drugs is only gradually being recognized, but it is well to remember that they occur not only in culture media, but in the bacteria themselves and in certain tissues and fluids of the animal body.

The presence of inhibitors in bacteriological culture media masks the *in*

TABLE 1

*Bacteriostatic Effect of Sulfapyridine on Pneumococcus Type I in Peptone Broth and in Liver Infusion*

Medium	Growth of <i>Pneumococcus</i> Type I * Concentration of Sulfapyridine							
	1:5,000	1:10,000	1:20,000	1:50,000	1:200,000	1:500,000	1:1,000,000	0
Peptone broth	—	++	+++	++++	++++	++++	++++	++++
Liver infusion	—	—	—	—	—	++++	++++	++++

\* Degree of growth estimated by gross turbidity after incubation at 37° C. for 24 hours  
++++ = maximum growth  
— = no visible growth  
Inoculum: 4,000 cells in a volume of 2.0 cc. of the respective media

*vitro* effect of the drugs and is the greatest source of error in determining accurately the susceptibility of bacteria to these compounds. It has been possible to devise a simple *in vitro* test to determine the susceptibility of various bacteria to the sulfonamide drugs. This test depends for its accuracy upon the use of a culture medium which is free of sulfonamide inhibitors and which will support the luxuriant growth of such fastidious microorganisms as the pneumococcus or hemolytic streptococcus, without the addition of peptone.<sup>6</sup> An infusion of fresh calf liver prepared on the acid side, and sterilized by filtration, has proved satisfactory, since pneumococci and many other microorganisms grow profusely in this infusion to which no peptone has been added. Moreover, if the infusion is prepared from fresh, unautolysed liver it is free of sulfonamide inhibitor.

The difference in the bacteriostatic effect of sulfapyridine upon the growth of a strain of pneumococcus Type I in

peptone-containing broth and in the specially prepared liver infusion is shown in Table 1. In plain broth sulfapyridine in a concentration of 1:10,000 is required to cause bacteriostasis, whereas in the liver infusion bacteriostasis occurs in dilutions of the drug as high as 1 part in 200,000.

The bacteriostatic effect of sulfapyridine on the parent and sulfapyridine-fast variants of the same strain of pneumococcus Type I is shown in Table 2. The tests were carried out in the liver infusion. In the case of the fast strain a 1:10,000 concentration of sulfapyridine is necessary to inhibit growth, whereas a dilution of the drug as great as 1:200,000 is partially bacteriostatic for the parent strain.

It should be emphasized that unless an inhibitor-free medium is used, tests for the susceptibility of bacteria of any species to the sulfonamide drugs are unreliable and may be wholly misleading. It is important, therefore, that a standard technic be employed in labora-

TABLE 2

*Bacteriostatic Effect of Sulfapyridine on Parent and Drug-fast Strains of Pneumococcus Type I in Liver Infusion*

Strain of <i>Pneumococcus</i> Type I	Growth of <i>Pneumococci</i> * Concentration of Sulfapyridine							
	1:5,000	1:10,000	1:20,000	1:50,000	1:200,000	1:500,000	1:1,000,000	0
Parent	—	—	—	—	+	++++	++++	++++
Sulfapyridine-fast	—	+++	++++	++++	++++	++++	++++	++++

\* Degree of growth estimated by gross turbidity after incubation at 37° C. for 24 hours  
Inoculum: 4,000 cells of the respective strains in a volume of 2.0 cc. of liver infusion

tories generally, in order to determine the occurrence of sulfonamide resistant strains and to evaluate their importance as a cause of failure of chemotherapy in pneumonia. Sulfonamide resistant strains have been encountered in a small proportion of pneumonia cases, but their general incidence is unknown. From the point of view of therapy it is well to emphasize that strains of pneumococcus which are sulfonamide-fast are fully susceptible to the action of type-specific antiserum.

In the course of this discussion mention has not been made of pneumonia due to agents other than pneumococci, since under ordinary circumstances other bacteria are responsible for only a relatively small proportion of the total number of cases. From the point of view of epidemiology and prognosis

the desirability of knowing whether hemolytic streptococcus, or staphylococcus, or *Hemophilus influenzae* is the infecting agent, should not be overlooked. From the therapeutic point of view this is also of interest, since already there is a limited amount of evidence which indicates that one chemotherapeutic agent may be more useful than another in the treatment of pneumonia due to one or other of these infectious agents.

#### REFERENCES

1. Heffron, Roderick. *Pneumonia With Special Reference to Pneumococcus Lobar Pneumonia*. New York: The Commonwealth Fund, 1939.
2. MacLeod, C. M. *J.A.M.A.*, 113:1405, 1939.
3. Cecil, R. L., and Austin, J. H. *J. Exper. Med.*, 28:19, 1918.
4. MacLeod, C. M., and Daddi, G. *Proc. Soc. Exper. Biol. & Med.*, 41:69, 1939.
5. Lockwood, J. S. *J. Immunol.*, 35:155, 1938.
6. MacLeod, C. M. *J. Exper. Med.*, 72:217, 1940.

# Principles of Administration Applicable to Health Departments\*

LENT D. UPSON, PH.D.

*Director, Detroit Bureau of Governmental Research, Inc., Detroit, Mich.*

ALTHOUGH volumes have been written on the theory and practice of public administration, no one as yet has had the imagination, capacity, and the courage to set down those intangibles which go to make the difference between the trained technician who can get things done and the trained technician who cannot. The volumes have dealt with the tools of administration—organization, budgets, accounting, planning—nothing about the administrator himself. Tools are necessary adjunct to effective administration just as they are to carpentering. But all the tools in the world would not make me into a respectable carpenter, nor will they make a technician into a respectable administrator—unless he possesses the fundamental qualities. I certainly have not the ability to enumerate the personal practices that are fundamental to sound administration. But I have learned to recognize some of them, even if I do not always practise them. If you are a good administrator you will recognize the few I mention and doubtless could add a dozen or more yourself.

All of us know that the first rule of effective administration is to appoint subordinates who are smarter than you

are. There is no need to fear that they will get your job some day because if you are smart enough to pick smart people you will be smart enough to hold your job in spite of them. And they are probably the people who are doing the real work that makes your job possible. An administrator is no bigger than the aggregate of his subordinates.

Probably the second rule of effective administration is to give subordinates as much credit as you can and still not build their reputations beyond their capacities. It is not fair to overdo the matter. You may build a man up to beyond his capacity to deliver on a new job. But there is more chance of underdoing the credit business than of overdoing it.

There is a corollary to that rule—never stand in the way of promotions. Losing a key man hurts sometimes. It may injure an organization and leave highly important jobs unfinished. Under those circumstances, is the loyalty of an administrator due his job or his men? In my opinion, the loyalty runs to the man and an administrator who steals his subordinate's opportunities to do bigger and more remunerative things is as reprehensible as if he had stolen his purse or his wife's affections.

Selfishly, the reputation of every administrator is enhanced no end by

---

\* Read before the Health Officers Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

capable associates who have gone on to upper ranks, appreciative for the training and opportunities given them.

In appraising the capacities of subordinates, it is well to remember that they are usually much larger than you believe. Every administrator instinctively measures his associates by the yardstick of his own personality and his own methods. In so far as characteristics deviate from that yardstick, he too often assumes them to be inferior. They may only be different—and that very difference may be a superior asset. At any rate, give the subordinate a chance to do a bigger job. He may do it differently from your way. It may be a better way.

If there is another commandment in dealing with subordinates, it is to keep lines of authority straight. Possibly nothing wrecks an organization so fast and so effectively as not to know where responsibility rests. Accordingly, the unforgivable sin of an administrator is to cut around those next in command and to give instructions directly to the ranks below. It is not only the matter of possible confusion that is important—it is the matter of morale. The most effective way to encourage insubordination and general discontent is to go splashing orders and instructions about regardless of your organization chart—making privates believe they are majors and majors believe they are nothing at all.

Don't try to handle details yourself—which is another way of saying don't know any facts you don't need to know, but be very sure of the ones you do need to know. You cannot know and are not supposed to know the multiplicity of detail involved in carrying on a considerable number of activities. To try to know these things means misstatements and eventual embarrassment. Let subordinates do that remembering for you—and accurately. It is no detriment to good administration to

consult a subordinate when information is required, or to present him to a group of outsiders when necessary, and it may help his ego and your business.

Don't ask your superior to approve detailed plans you are sure of. The mere asking raises doubt as to expediency, and questions about your capacity. It is far preferable to report to your superiors something already finished successfully than to inquire as to the feasibility of your plans for the doing of it.

If you are going into a conference in which there may be a challenge—take your gang with you. One of your associates may think up the right answer while you are stumbling over it. Or he may succeed in so confusing the issues that the opposition will be wholly in the dark. Loud talk and confusion may snatch a victory out of defeat. This administrative technic is particularly good at public hearings.

Don't answer letters promptly. Letters answered when you have first read them and your mind is full of the subject, are likely to be long and gossipy. Every administrator probably spends more of his own time and that of his secretary in writing silly and unnecessary letters than he does in real work.

Long letters are seldom read—you do not read those you receive yourself. It is said that Andrew Carnegie never read a letter longer than one page. Usually what you can say in a page you can say in a paragraph; what you can say in a paragraph you can say in a sentence—if you think about it long enough and hard enough. Thinking long and hard about the written word is important because probably the two most difficult tasks of our generation are to make money earn 6 per cent and to write the King's English so the other fellow can understand it.

There are many other rules that might follow under the head of what might be called "problems of personnel leader-

ship." I have others in my notes, but I pass them over for one concluding rule of importance. That rule is—always be kind to secretaries. The route to every "brass hat" is through the telephone operator and the girl (occasionally the man) who does a good deal of his thinking for him and much of the making up of his mind. A friendly voice in the mayor's office may be worth more than all of the technical tools of administration you can learn out of text books.

If I needed a text on which to hang this discussion of the tools of administration, I could find it in the language of one of the greatest administrators of all time, Samuel Pepys—an administrator who, during the great London plague and at the time when the Dutch were sailing up the Thames with brooms at their mastheads, was laying the foundation of the British Navy. He said that this day when he was walking in Drury Lane "I did see two or three houses marked with a red cross upon the doors, and 'Lord have mercy' writ there; which . . . put me into an ill conception of myself and my smell so that I was forced to buy some roll tobacco to smell and to chew, which took away the apprehension."

This is not an effort to drag the good Samuel in by his heels but rather to illustrate the primitive character of public health less than three centuries ago and to point out that probably very little of administrative technic was necessary in that field as compared to the one of building the British Navy with which Pepys was immediately concerned. The health officer of that time did not have to be a good administrator, because there was literally nothing to administer. In this case, he might better have been a sign painter or a tobacconist. Without knowing too much about your profession, I suspect that until the last 50 or 60 years a health officer got along very well if

he could nail up quarantine signs.

But today public health administration is a complicated, scientific business which begins with the recording of vital statistics and runs through the control of communicable diseases, the promotion of child hygiene, the control of occupational diseases, supervision of milk supply and of other food products, laboratory service, public health education, control of nuisances, supervision of hospitals and dispensaries, supervision of the construction and occupancy of buildings from a health standpoint, supervision of water supply and sewage disposal, supervision of public conveniences such as baths and comfort stations—and probably other items of which I have not thought.

A proper supervision of such a variety of activities requires something more than medical knowledge. The health officer must be something of a business man, an accountant, a statistician, a budgetary officer, a public relations agent, and even a hotel keeper in the sense that he is often responsible for the operation and maintenance of hospitals and similar institutions. To do such a variety of jobs requires every tool of administration at his command and these tools are not all of them to be found in a doctor's kit.

In this country, there are approximately 186,000 horse and buggy units of government—many of them units of health administration. In fact, in Wayne County, Mich., alone there are some 40-odd health units and, as I recall, only two or three of them with full-time health officers. In many of them a township supervisor—who is assessor, poormaster, and general factotum—is also the man responsible for quarantine signs and vital statistics.

Doubtless the unification of health units has been the subject of frequent discussions by your group, but I cannot emphasize too strongly that sound public health administration can never



follow as long as our metropolitan areas are cut up into minor contiguous districts, which makes integrated activities on behalf of public health impossible.

A second tool of public health administration in which new developments are taking place is that of the selection, control, and separation of personnel.

There are indications that the American public is getting thoroughly tired of a costly spoils system by which public jobs are the subject of political patronage with all the attendant evils. I say "tired" advisedly because in the last few years there has been more interest in the establishment of merit systems throughout the United States than in many years previous. I suspect that the next few years will see a rapid and wide expansion of the system of public employment by merit.

However, it must be borne in mind that styles and improvements in merit systems change just as they do with automobiles. Because a merit law met a certain situation 20 years ago does not mean that there have not been marked improvements in procedures over that period and frequent need for revision of existing situations.

Time does not permit more than the enumeration of two or three items that may be of interest to public health administrators. The first is the development of new examination technics in which larger emphasis than formerly is being laid upon personality and measurable mental traits in opposition to sheer book learning and experience. I do not claim that we know much about this field as yet, but I do believe that we are on the edge of discovering something about it and that, in a shorter time than we might think possible, civil service authorities will be looking into the aptitudes of candidates for jobs as well as at their immediate capacities to perform them. And this change in the attitude of civil service authorities will come just as fast as health officials and

other public officials insist that it come.

Next is a different attitude toward the closed or open backdoor with respect to public employees under the merit system. In the past, most backdoors have been closed, that is, a public employee could only be dismissed after his superior had proved him guilty of serious derelictions of duty. I believe that this provision in civil service laws has done a good deal to undermine public confidence in the merit system and to retard its development. The public is often disgusted with the discourtesy and incompetency of employees which exist simply because they feel that they are free from discipline. The intelligent public official is equally disgusted with a system which hinders the dismissal of the incompetent. I realize that we live in a time when many groups are coming to believe that a man has a vested interest in a job which he holds. I hope I am sufficiently socially minded to appreciate this point of view. But it is possible that there may be developing a compromise between a wide open backdoor which permits a public officer to fire a public employee without a hearing and without cause and a closed backdoor which prevents him firing one for anything less than a hanging offense. The compromise may be slow, but it will be expedited if public officials will come to the aid of citizen groups which are concerned with improving the personnel systems of public agencies.

A third feature of the merit system which is perhaps worthy of some consideration is the possibility of utilizing a somewhat different type of merit agency in those departments that have serious disciplinary problems. I refer particularly to police and public health, and sometimes wonder whether we should have a uniform merit system that applies the same rules and regulations to all the varied groups in public service. In Detroit, when it was pro-

posed that the entire police department be placed under civil service, some of us concluded that the selection and promotion of policemen should not become a cut and dried matter but should be administered by a separate merit board, the control of which would lie largely within the police department itself, but with adequate safeguards of publicity to prevent political chicanery. In consequence, a police merit board was created which follows none of the ironclad rules of selection, promotion, and discipline that are found in ordinary civil service laws, but which operates in such a fashion that favoritism and corruption in those same selections and promotions and dismissals cannot easily enter.

I mention this because health authorities also employ doctors and nurses who must be under the strictest of discipline and where it might be to the advantage of the public for control to remain with the health officer.

A further new development is in the field of budgetary control. Nearly a quarter of a century ago, I had the privilege of talking to this same group and, if I recall correctly, talked upon the subject of budget making because it was a new idea in administrative procedure. In those days, even the United States Government had not yet adopted a budget procedure, and scientific budget making was a new and somewhat untried device to bring about a more effective operation of public departments and a conservation of public funds.

The only new development in that field—although further development is much needed—is in budgetary control. Here the introduction of the allotment system in the last half-dozen years promises to have some effect on overspending and in the ultimate control of deficits. The value of the system of monthly or quarterly allotments of appropriations authorized by the legisla-

tive body has not been proved beyond doubt, but there are indications that we are working toward a system which will prevent an administrator from consciously or unconsciously overdrawing his appropriation which results in deficits and all of the evils of deficit financing.

Finally, one of the newest tools in the administrative field is that of long term planning. Here again there has been experimentation for nearly a generation but no well established principles have as yet been developed. Many long term plans having to do with physical construction have been prepared by cities and states, some of which have been followed rationally and others of which have been thrown into the discard after brief experiment. One would think that long term planning on public construction would be relatively simple—but unhappily such plans find it difficult to reckon with depressions and world wars and other catastrophies which upset the best of long range thought. However, it occurs to me that we have perhaps been neglecting the field of long term planning of operation budgets, although in certain areas such long term operating plans have greatest opportunity for success.

In education, recreation, public health, and other city activities, it would seem possible for an administrator to set down rather definitely the goals which he aspires to reach over a given period of years. I can well believe that a health officer in expounding his budget to a city council and to the public might speak in terms of what he hoped to do one year, five years, even ten years ahead, and would estimate something of the cost of the innovations he had in mind and something of the savings that might result from such innovations. I suppose that every health officer has secretly or semi-secretly thought of the substitution of

convalescent homes for certain types of hospitalization, deliberated on the extension of food inspection, calculated the years that might elapse before the development of full-fledged smallpox control, diphtheria control and whooping cough or scarlet fever control, but I venture that few have put down on paper the moves that should be made and the financial elements involved in each.

We are all going to hear more about long term planning in the years to come when budgets are likely to be more slender in view of current events and when public officers will be required to defend with great clarity any proposal looking to the expansion of activities or even their continuation at current levels. It is probably need-

less to say to you that the many billions of dollars that are now being siphoned off for relief and preparedness are not going to be available for the purposes that are closest to your heart. Whatever the causes of present calamities may be, we must understand that, as a result in the years to come, there will be less education, less public health, less police protection, more holes in street paving and longer intervals between the collection of garbage.

The public servant who renders the most effective service will be the one who has innate capacities for administration and who can strengthen those capacities by the use of the tools of administration that are now available so as to render effective service at a minimum of cost.

# A County Program for the Care of Prematures\*

H. R. O'BRIEN, M.D., AND MARION I. MURPHY, R.N.

*Commissioner of Health; and Director of Nurses, Cattaraugus County  
Department of Health, Olean, N. Y.*

IN 1936 Cattaraugus County† mapped out a new program for mothers and infants. The infant mortality and neonatal mortality rates for the years 1931-1935 had been 64.6 and 43.5 respectively, with 28.6 per cent of all infant deaths associated with premature birth. The problem of the premature infant, as in other communities, thus seemed to be a major one, and the special program outlined below was initiated.

## FINDING THE PREMATURE INFANT

How are premature babies located? If one is to be delivered at home, the physician may call the nurse to accompany him. Or he may telephone the nurse soon after the baby has come, telling her the baby has arrived prematurely, and asking her help in caring for it. The more this service is known and understood among physicians, the oftener the district nurse is called.

Our county health office also locates premature infants via birth certificates. For two years and a half we had a special form, bound with the birth certificate, but sent by the physician direct to us, on which was indicated, among

other items, at just which month of gestation the baby was born. Notice of a premature stirred us to immediate action. We telephoned the physician to learn if the baby were still alive, and if so, what we could do to help. These special slips were discontinued on December 31, 1939. Since that time the state has provided special birth certificates, on the back of which is a similar special report. These are sent in by the local registrars, three or four days after birth possibly, but still frequently in time for us to be of some service.

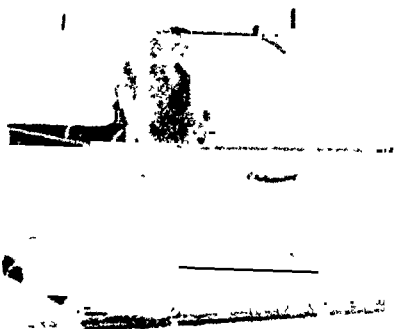
## EDUCATIONAL ACTIVITIES

Having found the prematures, the next task is educational. We ourselves must learn the best modern ideas for caring for prematures, consider how those methods can best be adapted to our local conditions, and expose to those ideas, one after the other, the people in our community, doctors, nurses, and others who take care of prematures.

We began with our own staff. Our supervising nurse on a vacation trip visited the Sarah Morris Unit of Michael Reese Hospital in Chicago and later, through the courtesy of the Massachusetts State Department of Public Health, took a 2 week course in care of prematures at the Boston Lying-in Hospital. Our medical consultant was sent to Chicago for a few

\* Read before the Maternal and Child Health Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

† With the aid of the Children's Bureau and the New York State Department of Health.



*Portable home incubator devised in  
Cattaraugus County*

days. At various times our commissioners visited other hospitals with special facilities for the care of premature infants. The literature in the field was reviewed by local staff members. Through formal programs in staff meetings and through consultation by the supervising nurse in dealing with individual cases, the information gathered was passed on to our nurses in the field.

For the practising physicians, we planned an institute under the auspices of the Maternal Welfare Committee of the County Medical Society. An able young pediatrician of Rochester was invited to speak on medical problems, and our supervisor spoke on nursing care. The meeting was held at night in a local hospital and was well attended. We took advantage of the presence of the out-of-town speaker to hold a meeting for nurses that same afternoon, when much the same program was presented. Twenty-eight hospital, 8 private duty, and 18 public health nurses attended in the afternoon, and 40 practitioners in the evening.

But education must be a continuing process. Our consultant is called on by the physicians in individual cases—we would like to have this done even more extensively. Our assistant commissioner was appointed Consultant on Maternal and Infant Hygiene on the staff of one of our hospitals. Here he

is in a logical position to promote modern ideas on care within the hospital, and to arrange for care by public health nurses when prematures are discharged from the hospital. We have in mind the preparation of a pamphlet on premature care under local conditions. Perhaps it should be in three editions—for doctors, for nurses, and for parents.

#### THE PORTABLE INCUBATOR

We have made rather a point of providing portable incubators for home use. A local metal products plant was induced to make incubators similar to those used in Chicago. Various improvements were suggested—a hinged top by a nurse, a thermostat by a doctor, a painted finish, and so on. Finding suitable thermometers and thermostats took time. Most of our incubators are used in homes with electricity, but several are built to employ hot water bottles or heated bricks, for use in homes without electricity. We now have 14 incubators, located in 8 district nursing stations over the county.

We have found various advantages in providing incubators. Here is tangible evidence that work for prematures is not just a vague program. The incubator provides much needed heat for the tiny baby. It is also a solid reminder that this baby needs special care. An incubator makes it easier to keep visitors away, thus helping prevent infection, and easier to hold to an unusual and strenuous feeding schedule.

Every physician in the county knows that he can get an incubator by calling the district nursing station. Such a call receives immediate attention, day or night. A record is kept in the central office of the whereabouts of each incubator, enabling us to supply an additional one or a special model on demand. If a nurse is called for home delivery ahead of scheduled time, she takes an



*Equipment used in care of premature infants:*

1. Doll (for demonstration)
2. Catheter for aspirating throat
3. Rubber syringe for aspirating throat
4. Medicine dropper with rubber tip
5. Gavage equipment
6. Small nursing bottle (1 oz.) with soft rubber nipple
7. Feeder of the Breck type
8. Improvised oxygen tent for use in crib.

*(reading from left to right)*

incubator along. Every hour saved helps.

While our hospitals usually have more elaborate incubators, our portable ones are frequently a help. If a second baby is born underweight, the newcomer goes into the hospital incubator, the older premature graduates into one of ours. Frequently, too, a premature is going home—he is doing well, the family needs to save money, home conditions are promising, but he will be better off with special provision a while longer. One of our incubators is sent to the hospital and he goes home in it.

#### RÔLE OF THE PUBLIC HEALTH NURSE

Our own public health nurses naturally play a special part in our program

for care of prematures. Nursing care is based on three main principles: (1) maintenance of a stable body temperature, (2) assistance with proper feeding, (3) prevention of infection.

In addition to the heat supplied by the incubator, a double flannel jacket with a hood is used. This was adapted from a model at Boston Lying-in Hospital and a supply was made up for each District Health Station by the local nursing committee. Recently each incubator was supplied with a roll of sterile cotton about 33" long in which a new-born premature might be enveloped immediately after birth to prevent initial heat loss. We have found that in most home deliveries of premature infants the home is not too well prepared and the room in which

the birth takes place may be chilly. Help is limited, and at best a blanket or diaper is loosely wrapped around the baby while necessary care is given the mother. Or it may take considerable time to heat the incubator—in either of these events, the baby will be warmer in the cotton.

One of the most important functions of the public health nurse is to stress the importance of breast milk from another mother in the community until such a time as the mother's own supply is adequate. Village or rural people are apt to be unusually interested and willing to help in such an emergency. The nurse also has a responsibility in assisting the mother of the premature to establish and maintain a supply of breast milk. Not enough nurses are convinced of the value of breast milk or know how to teach manual expression—a nursing job and one which cannot be shirked if good care is the goal.

Feeding apparatus for home cases is necessarily simple. Most widely used is the medicine dropper with rubber tip and medicine glass. A 1 oz. bottle with a special small soft nipple has also been found an invaluable aid not only to the infant but also in showing the family how very small an amount of feeding is adequate at one time. The medicine droppers and small bottles which we use are the type in use at Sarah Morris Hospital, Chicago.

Occasionally a doctor suggests a feeder of the Breck type. We have one in the department which has been

loaned and demonstrated several times. The small bottles mentioned before are also loaned out to families since it is usually impossible to purchase such equipment locally. Gavage feeding has not seemed practical for home cases unless a special nurse is available.

Hand washing is the keynote in our campaign against infection. Masks seem risky unless very carefully handled, and are not commonly used. Careful boiling of feeding equipment is stressed, but is the most difficult procedure to carry out in some rural homes. It takes so long to boil bottles, nipples, etc. over a wood fire that the value is not always appreciated by the family. One family startled the nurse the day following a careful demonstration when they said, "Nurse, did you you say to boil the bottle or just dip it in hot water?"

Home care of premature infants cannot help being time consuming. Careful detailed demonstration and discussion of each point is necessary. Someone in the home must be definitely responsible for the infant at all times. Upon the public health nurse falls the responsibility of interesting her doctors, patients, and committees in better care for prematures and, most important, of always being on hand to offer her own services.

Such is our program, and when new ways are found of helping prematures, we want to know about them and pass them on to our doctors, nurses, and parents.

# Observations on the Familial Incidence of Cancer\*

JAMES A. CRABTREE, M.D., F.A.P.H.A.

*Surgeon, National Cancer Institute, U. S. Public Health Service, Bethesda, Md.*

DURING the past two years, one of the elements of the general research program of the National Cancer Institute has been an effort to study cancer primarily from an epidemiological point of view. One aspect of this study includes the interview by personnel of the Cancer Institute of individuals with authenticated diagnoses of cancer admitted to certain coöperating institutions.

The work was begun in Memorial Hospital, New York, in August, 1938, extended to include Hines Veterans Hospital, Chicago, in September, and further extended to include Charity Hospital, New Orleans, in November of the same year. In February, 1940, the work was transferred from New Orleans to the Barnard Free Skin and Cancer Hospital, St. Louis. It is a pleasure to acknowledge gratefully the assistance rendered by these institutions and their coöperation in making their cancer patients available to us for interview.

The epidemiological schedule was designed to provide data which would serve as a basis for a study of the extent to which a variety of factors (occupational, environmental, familial, racial, dietary, economic, medical, and social) may be related etiologically to cancer of various forms and anatomical sites.

The purpose of this discussion is to present the results of observations made to date on the familial incidence of cancer as recorded for members of families of patients with microscopically verified cancer of certain selected anatomical sites. Aside from the results which are altogether tentative, because of the small numbers involved, the character of the data and the general method of analysis are thought to be of some special interest.

The hereditary origin of cancer has long been a popular doctrine and the part played by heredity has been one of the most actively investigated branches of cancer research. In spite of this, the extent of its influence upon the incidence of human cancer is not known nor may it be assessed quantitatively even though one uses most of the clinical data recorded in the literature.

In a vast majority of the almost innumerable instances of reports in the literature, results of such clinical studies are reported in terms of the percentage of cancer patients giving a history of cancer in one or more relatives. Obviously, results stated in such a manner, in order to be significant, must take into account the number of relatives observed, the degree of their relationship to the patient, and their age distribution. If this is not done, no common denominator is available for an expression of differences between various clinical groups. For example,

---

\* Read before the Epidemiology Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.



it is quite clear that a negative familial history of cancer of a patient whose father died at age 30 from an accident and whose mother died at age 28 from puerperal causes, and who had only one brother and one sister both of whom died in infancy, would in no way be comparable with the negative history of another patient whose parents survived to the seventh or eighth decade and with six siblings all of whom had also survived to reach the cancer age.

The familial experiences of these two patients, however, can be placed on a comparable basis through the employment of a modified life table procedure, taking into account the ages of the parents and siblings at the time they came under the observation of the patient, the ages at the time they were dropped from observation (ages at death or present ages if living), and the number of years of life during the period of observation. In this way their cancer experience is expressed as the number of deaths from cancer in proportion to the number of years of life spent at various ages.

The epidemiological schedule, referred to above, contains the data necessary for this method of approach. The record includes among other items, the age, sex, and color of the patient, the age of probable onset, and the anatomical location of the primary site of cancer, the dates of last observation of each parent and all siblings, their ages at the time of last observation and their status, i.e., whether living or dead, and if dead whether or not they died from cancer and, if so, a further statement, wherever possible, as to the primary site of the disease.

For purposes of recording their life table experience, the parents may be assumed to have been under observation from the time the patient was born until the date of death or of last observation if living. Obviously the life experience of the mother up to the date

of the birth of the patient, and of the father up to within a short time prior to the patient's birth can have had no mortality, does not come within the period of observation of the patient and therefore is of no concern in the present record.

In the case of the siblings, while all of them are entered in the record, those dying or otherwise dropped from observation at ages under 25 years are excluded from the present tabulations because of the uncertainties of the informants as to the particulars of dates, ages, and causes, and also because of the negligible cancer mortality known to obtain during this period of life. For present purposes the observed life experience of all siblings surviving age 25 is assumed to begin at age 25 and continues to the age at death or the age at last observation if living.

From these data the life-experience of both parents and siblings may be expressed in terms of person-years of observation, divided into appropriate age periods, and the number of these person-years represents an experience equivalent to that obtained by observing a corresponding number of persons over a period of one year. Cancer deaths recorded during this period of observation thus if desired, could be expressed in terms of annual mortality rates.

As an example, assume a cancer patient aged 62, at the time of interview in 1940. The father died from diabetes at the age of 58 in 1907; the mother died from cancer of the breast at the age of 51 in 1902; three brothers were living and well at ages 54, 57, and 59 respectively in 1940, one sister died in 1932 from lobar pneumonia, at the age of 56. In this instance the father came under observation 62 years ago, at the age of 29 and remained under observation for 29 years, i.e., until the age of 58 when he died from diabetes. Thus the life-experience under obser-

vation totals 29 person-years (one-half person-year at ages 29, and 58, and one person-year at each year of age from 30 to 57 inclusively). For life table purposes this is equivalent to observing 28 persons, one each at ages 30 to 57 for one year and two additional persons for one-half year, one at age 29 and one at age 58. Similarly the mother came under observation 62 years ago at the age of 27 and remained under observation for 24 years, i.e., until the age of 51 when she died from cancer of the breast. She therefore contributed 24 person-years of observation (one-half year at age 27, one year at each year of age from 28 to 50, and one-half year at age 51). Each of the siblings, for present purposes, entered observation at the age of 25 and continued to ages 59, 57, 54 and 56 respectively, each thus contributing one person-year at age 25 and at each year of ages thereafter except one-half person-year at ages 59, 57, 54, and 56 respectively. The life experience of all the siblings combined totals 128 person-years (34.5, 32.5 and 29.5 for the three brothers and 31.5 for the sister). The crude annual rate of mortality can thus be expressed, in the case of the father as the equivalent of one death from diabetes in 29 persons, for the mother one death from cancer of the breast in 24 persons, and for the siblings one death from lobar pneumonia in 128 persons. Age-specific rates could be obtained merely by applying the deaths which occurred at given ages to the number of person-years experienced at corresponding ages.

Some idea of the relative force with which familial factors express themselves in the genesis of cancer may be obtained by determining the number of deaths from cancer recorded for the parents and siblings of our cancer patients and comparing this number with that which might be expected to have occurred on the basis of a normal

mortality experience. The normal or expected number of deaths is obtained by applying to the life table population the age-specific death rates from cancer which obtained in the U. S. Registration Area during the same period of time for which the life-experience of the study population is recorded. In this connection it was noted that in the case of parents, the life experience at ages 15 to 34 centered around the year 1890, at ages 35-44 around 1895, 45-54 around 1900, 55-64 around 1910, 65-74 around 1920, and 75 years and over, around 1930. In the case of the siblings life-experience at ages 25-44 centered around the year 1925, 45-54 around 1930, and at 55 and above around 1935. Consequently in arriving at the expected number of deaths, the death rates which are applied to the various age groups of the study population are those which obtained for the country at large at different periods of time.

The data here considered are from the records of 1,029 cancer patients including 522 white females and 507 white males. The females include 294 persons with cancer of the breast, 152 with cancer of the uterine cervix, and 76 with cancer of exposed areas of the skin; males include 256 persons with exposed sites of skin cancer, 131 with cancer of the lower lip and 120 with cancer of the lung.

Table 1 is included here to show the life-experience and the recorded mortality from all causes and from cancer, in the parents of all patients, combined.

The observed life-experience of all parents included in the records totals 64,570 person-years. Columns 2 and 3 in Table 1 show the death rates from all causes and from cancer which obtained for the country at large for the various age groups shown in column 1 and at the various dates shown in column 4. The number of deaths in parents from all causes and from cancer actually re-

TABLE 1

*Observed and Expected Mortality from All Causes and from Cancer, in the Parents of 1,029 White Persons with Carcinoma of Certain Selected Sites*

Age (1)	Death Rates U. S. Registration Area			Person-Years Life Table Population (5)	Deaths All Causes		Deaths From Cancer	
	All Causes (2)	Cancer (3)	Date (4)		Observed (6)	Expected (7)	Observed (8)	Expected (9)
15-24	6.9	0.052	1890	1,477.5	10	10.2	0	0.076
25-34	10.2	0.124	1890	8,331.0	63	84.6	2	1.031
35-44	11.2	0.562	1895	14,712.5	165	165.0	12	8.262
45-54	15.0	1.395	1900	15,602.5	232	232.5	34	21.750
55-64	26.5	3.426	1910	12,916.5	356	342.1	61	44.390
65-74	52.0	6.000	1920	7,970.0	411	413.9	68	47.750
75+	129.0	9.900	1930	3,560.0	380	456.1	33	34.600
Total				64,570.0	1,617	1,704.4	210	157.859

ported by the patients interviewed are shown in columns 6 and 8. The numbers of deaths which would be expected to have occurred had these parents experienced mortality normal for the country as a whole are shown in columns 7 and 9. These numbers are obtained by applying the rates shown in columns 2 and 3 to the population shown in column 5.

Special significance of Table 1 lies in columns 6 and 7 which show the recorded and expected number of deaths from all causes. Except for persons at ages 75 years and above, there is excellent agreement between recorded and expected mortality experience. This close agreement may be interpreted as evidence of essential accuracy of the data and soundness of the procedure. The rather wide disparity between recorded and expected deaths at age 75 and above probably is due not to a failure to record all the deaths, but to extending (in the record) the life of the older parents beyond the ages to which they actually survived. The tendency to exaggerate the ages of old people appears to be a universal one. Thus it is probable that the number of person-years shown for age 75 and above is considerably in excess of the actual experience. Fortunately, however, for purposes of studying an excess of cancer mortality in the life table population as a whole, the error is relatively

insignificant and in a direction which will add conservatism to the tentative results.

When cancer mortality is considered for the group as a whole (columns 8 and 9) it is of interest that 210 deaths were recorded in contrast with 158 expected, an excess of about 34 per cent. Except at ages 15-24 (where numbers are obviously insignificant) and 75 years and above (where a plausible explanation is available), the excess of mortality is quite consistently distributed throughout the life span of the parents, with no single age group showing any concentration of deaths out of proportion to that of the others.

The tabulations shown in Table 1 have been carried out separately for different groups of these 1,029 patients, divided according to primary site of disease and each of these further divided into those with onset of cancer below the median age for the whole group and those with onset above the median age.

Table 2 shows the data which relate to the experience of the parents of the 294 persons with cancer of the female breast. The median age of onset of cancer in these 294 persons is about 45 years. It will be noted that the parents of those patients whose breast cancer occurred at a relatively early age suffered a mortality from cancer more than twice as great as expected,

while in the parents of patients with late onset of disease, the number of cancer deaths does not greatly exceed the normal.

the parent occurred in the same site as in the patient, and also in the same sex as the patient. It is hardly necessary to emphasize here that although the

TABLE 2

Mortality by Age, from Cancer in Parents of White Females with Cancer of Breast:  
(a) With Onset of Disease at Ages 45 and Under, (b) With Onset of Disease at Ages 46 and Over

Age	Onset of Cancer in Patients at Ages 45 and Under			Onset of Cancer in Patients at Ages 46 and Above		
	Person-Years	Actual	Expected	Person-Years	Actual	Expected
15-24	167.5	0	0.009	180.0	0	0.009
25-34	1,295.0	1	0.160	1,051.0	0	0.131
35-44	2,216.0	4	1.250	2,020.0	2	1.138
45-54	2,295.0	8	3.200	2,100.0	4	2.922
55-64	1,807.5	11	6.190	1,740.0	6	5.952
65-74	892.5	14	5.350	1,105.0	10	6.640
75+	277.5	2	2.601	685.0	6	6.622
Total	8,951.0	40	18.760	8,881.0	28	23.414

Because of space limitations, additional tables are not included to show the detailed tabulations for the other clinical groups, but the data have been summarized and are shown in Table 3.

Table 3 shows for the six clinical groups of patients, these divided into those with early and those with late onset of disease, the number of deaths from cancer in parents and the ratio of this number to the number expected on a basis of normal experience. In addition the table shows the percentage of deaths in parents where the cancer in

study population is relatively large, the numbers of deaths recorded for the different groups are quite small, and any conclusions that may be derived therefrom would of necessity be tentative.

In the first column of Table 3, the clinical groups of patients are listed in the order of the excess of mortality in their parents, the ratios of observed to expected deaths varying from 1.84 for parents of white females with cancer of the skin to 0.82 for those of white males with cancer of the lung.

It is of particular interest to note

TABLE 3

Cancer Deaths in Parents of Patients with Cancer of Certain Selected Sites:  
(a) Ratio of Observed to Expected Number, (b) Distribution According to Same Site and Sex as Patient

Cancer Deaths in Parents								
Site of Cancer in Patients	Number of Deaths	Ratio Obs. Exp.	Obs. Ratio ——— Exp.		Per cent of Total Cancer Deaths in Parents Where Cancer Occurred in			
			Onset in Patient at Early Age	Onset in Patient at Later Age	Same Site as Patient	This Site in Rest of Parents	Same Sex as Patient	This Sex in Rest of Parents
Skin—Female	18	1.84	1.6	2.0	28.0	9.4	66.7	58.3
Breast—Female	68	1.61	2.2	1.2	25.0	16.2 *	64.7	56.3
Skin—Male	55	1.29	1.8	1.0	23.6	6.4	49.1	38.1
Cervix—Female	27	1.21	1.5	0.9	46.7	19.3 *	55.6	59.6
Lip—Male	26	1.15	1.6	0.7	15.4	2.2	38.5	41.3
Lung—Male	16	0.82	0.9	0.7	0.0	0.5	43.8	40.7

\* Per cent of deaths in mothers only

that except for the parents of females with skin cancer (here the number of deaths is only 18) excessive mortality, where present, is confined to the parents of those patients whose cancer occurred at a relatively early age.

The last four columns of Table 3 show data which are of some interest from the point of view of site- and sex-specificity in the familial incidence of cancer. It may be noted here that of the 210 recorded cancer deaths in parents, 124 were in mothers and 86 in fathers. Column 6 in Table 3 shows for the parents of each clinical group of patients the percentage of cancer deaths where the cancer in the parent occurred in the same anatomical site as that of the patient. Column 7 shows for comparison the percentage of deaths among the parents of all the rest of the clinical groups where the cancer occurred in the same site as that in question. For example, 28 per cent of the 18 deaths in parents of females with skin cancer were recorded as due to cancer of the skin, while only 9.4 per cent of the remaining 192 cancer deaths in parents were due to skin cancer. In the case of the groups with breast and uterine cervix cancer, the percentages are based on deaths in mothers only.

Similarly column 8 shows the percentage of instances of fatal cancer in

parents where the sex of the cancer parent is the same as that of the patient, with comparative figures for the remainder of parents shown in column 9.

For all sites except lung (and here the reliability of the data is open to serious question), there is evidence of a rather striking tendency to site-specificity in the parental incidence of the disease. Sex-selection on the other hand is hardly if at all noticeable.

The same general treatment of data has been carried out for the siblings of these 1,029 patients, the results of which are summarized in Table 4.

The siblings taken together contributed a total of 93,506 person-years of observation, and for whom there were recorded 134 deaths from cancer as compared with 94.2 expected deaths. Of the 134 recorded deaths, 56 were in brothers and 78 in sisters of the patients.

In Table 4, the clinical groups of patients are listed in the order of excess mortality in their siblings. The ratio of observed to expected deaths ranges from 1.8 in the siblings of patients with cancer of the cervix to 0.7 in those of males with cancer of the lung. Although not shown in the table, the evidence, in so far as it may be supported by such small numbers as these, as in the case of parental cancer, indicates that the excessive mortality

TABLE 4

*Cancer Deaths in Siblings of Patients with Cancer of Certain Sites:  
(a) Ratio of Observed to Expected Number, (b) Distribution  
According to Same Site and Sex as Patient*

Deaths from Cancer in Siblings of Cancer Patients			Per Cent of Cancer Deaths in Siblings Where Cancer Occurred in			
Site of Cancer in Patients	Number	Ratio Obs. Exp. = 1	Same Site as Patient	This Site in Rest of Siblings	Same Sex as Patient	This Sex in Rest of Siblings
Cervix—Female	23	1.8	31.2	25.0 *	69.6	55.8
Skin—Female	19	1.7	21.0	14.8	47.4	60.0
Breast—Female	37	1.6	40.7	28.0 *	73.0	52.6
Lip—Male	14	1.3	7.1	5.8	35.7	42.5
Skin—Male	34	1.2	29.4	11.0	58.8	36.0
Lung—Male	7	0.7	0.0	0.8	57.1	40.9

\* Per cent of deaths in sisters only

when present is confined very largely to the siblings of those patients whose cancer occurred at a relatively early age. This is particularly true of siblings of patients with cancer of the breast, cervix, and skin. It will be noted from Table 4 that there is also some tendency for site-specificity except in cases of lip and lung cancer, although the tendency appears to be less in the case of siblings than of parents. Sex-selectivity, however, especially in the groups of male skin, cervix, and breast cancer, appears to be more prominent than that shown in the parents.

Notwithstanding the small numbers on which these observations are based, there are certain general conclusions which, though tentative, appear to be reasonable. The incidence of fatal cancer in the parents and siblings of white females with cancer of the skin is nearly twice that which would be expected on a basis of normal experience: For patients with cancer of the breast and cancer of the cervix the familial incidence is more than  $1\frac{1}{2}$  times normal; for males with cancer of the skin, excessive familial incidence is noted only for those persons whose skin cancer developed at a relatively early age; for patients with cancer of the lip, familial incidence is only slightly in excess of normal, and for those with cancer of the lung it is considerably below normal.

Where an excessive familial incidence is noted it is almost invariably limited to the parents and siblings of those patients whose cancer developed early in life. This is especially true in the case of patients with cancer of the cervix, of the female breast, and males with cancer of the skin. For these three groups the familial incidence is from  $1\frac{3}{4}$  to  $2\frac{1}{2}$  times the normal, but for these same clinical groups whose cancer occurred relatively late in life, the familial incidence is altogether nor-

mal. A tentative interpretation of these observations is that familial factors when involved in the genesis of cancer tend to express themselves relatively early in the life of the individual, while cancer of any of these specific sites which develops relatively late in life can more reasonably be ascribed to environmental factors.

Obviously an excessive familial incidence of cancer does not necessarily imply the presence of hereditary or genetic factors in the genesis of the disease. For example, taking both male and female patients with cancer of the skin, and considering their parents and siblings together, there was a familial incidence of 126 cancer deaths recorded, as compared with an expected number of 90.6. Thirty-two of these 126 deaths in parents and siblings (almost the entire excess) were stated to be due to skin cancer. It is conceivable that this excessive mortality from skin cancer in parents and siblings may be a function of certain environmental factors common to both patients and members of their families, and thus in no way related to innate conditions of heredity. Indeed it is quite probable that in the case of skin cancer a part, though not likely all, of the excess in mortality may be ascribed to environmental factors. The data at hand are too limited to allow for a more detailed breakdown for study from this point of view.

On the other hand, cancer of the female breast and cervix are much less likely to have origins from environmental factors which would be common to both patients and members of their families. Hence an excessive familial incidence of the disease in such cases may be assumed to be somewhat more probably of hereditary origin. Certainly a normal familial incidence in patients with cancer of the lip and cancer of the lung is presumptive evidence of the absence of heredity as a

predominant element in the genesis of these two forms of the disease, and, therefore, suggests for these two sites a relatively greater importance of environmental factors.

Finally these observations may be interpreted as in general agreement with

an accumulating body of evidence that cancer of different forms and sites comprise different epidemiological entities, the circumstances and conditions surrounding the genesis of which will likely prove to follow patterns more or less characteristic for each separate group.

# Antirabic Vaccination—Present Status\*

LESLIE T. WEBSTER, M.D., F.A.P.H.A.

*The Rockefeller Institute for Medical Research, New York, N. Y.*

WITHIN the past 5 years laboratory workers have renewed their interest in rabies. This is due in part to the development of more quantitative experimental technics and in part to increased knowledge of neurotropic virus diseases, of which rabies is a classic member. Major developments have been, first, wider information on the amount of rabies in a community and, second, improvements in assaying rabies vaccines.

Knowledge of the incidence of rabies has been furthered through the use of the mouse diagnostic test.<sup>1</sup> Leach and his coworkers in Alabama<sup>2</sup> and Sellers in Georgia<sup>3</sup> report that approximately 11 per cent of specimens sent to the laboratory for diagnosis, and found negative according to the Negri body test, prove positive to the mouse test. Moreover, Denison and Leach report<sup>4</sup> that of 477 dogs found dead on the street or in the home and not suspected of being rabid, 5.2 per cent harbored rabies virus. Thus rabies proves more widespread in these communities than is ordinarily supposed.

With respect to rabies vaccines, a recent review of laboratory experiments<sup>5</sup> disclosed that results of tests on vaccines were in general irregular, and immunizing potency meager, with little superiority of one preparation over another. Finally, the need was

plain for some quantitative, practical potency test.

To meet this need a quantitative procedure was developed in mice at the Rockefeller Institute, consisting essentially of (a) testing the virulence of a given preparation by injecting mice intracerebrally, and (b) measuring its immunizing potency in m.l.d. by vaccinating mice with the material and testing them 3 weeks later with graded doses of virulent virus.

The mouse test showed<sup>6</sup> in our hands that commercial vaccines containing virulent virus possessed considerable immunizing potency. Non-virulent phenolized preparations, on the other hand, whether designed for human or animal inoculation, generally failed to immunize mice. Non-virulent chloroformized vaccines immunized mice regularly, provided at least two times the stated dose was employed.

The results of the mouse test were checked in dogs and found similar.<sup>7</sup> Beagle dogs, aged 4 to 6 months and weighing 16 to 20 lbs., received the test vaccines according to the needs of the experiment. An equal number of unvaccinated dogs was set aside as controls. Three weeks later all were given a known number of m.l.d. of Negri body-producing, dog passage, virulent rabies virus into the neck muscles. The findings in the dog tests parallel those in mice in that phenolized vaccines found to be negative in mice proved likewise negative in dogs, and chloroformized vaccines, equivocal in mice,

\* Read at a Joint Session of the Laboratory and Epidemiology Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 11, 1940.



proved the same in dogs. Finally, larger doses of chloroformized vaccines proved effective, though irritative, in both mice and dogs.

Wyckoff and Beck<sup>8</sup> of the Lederle Laboratories, and Habel<sup>9</sup> of the U. S. Public Health Service have lately published results of their examination of the mouse test and regard it as a reliable method of evaluating anti-rabies vaccines.

Leach and Johnson are testing vaccines directly in dogs<sup>10</sup> with results thus far which do not differ materially from those already in the literature.

A number of workers are attempting to improve the various vaccines now on the market. Habel is reporting studies of the immunizing potency of different strains of fixed virus employed throughout this country in the manufacture of vaccines.<sup>11</sup> This is a basically important project. He finds that immunizing potency is apparently not related to degree of removal from street virus, to resistance of the virus to glycerin, nor to the species of animal in which it is carried. He finds immunizing potency related to ability of the virus to resist the killing effects of phenol and perhaps to the rapidity with which it is passaged. Other workers are making similar studies.

Experiments on optimum source of virus are under way in several laboratories. We have found that mouse brain culture virus<sup>12</sup> is virulent for mice when injected intracerebrally through the  $10^{-3}$  dilution. When injected intraperitoneally as a vaccine, it proves harmless in doses as large as 1 cc. and, when injections of as little as 0.02 cc. are given, immunizes against 1,000 intracerebral doses. In dogs,<sup>13</sup> as much as 200 cc. of culture virus can be injected intraperitoneally without harm and as little as 1 cc. will immunize them against a lethal dose of virus given intracerebrally. Kligler and Bernkopf<sup>14</sup> have confirmed these results in mice.

These workers also report moderate success in immunizing mice with chick embryo allantoic membrane and chick embryo brain virus. And Dawson<sup>15</sup> finds that virus passed intracerebrally through chick embryos loses virulence for rabbits, yet immunizes them, although it does not lose pathogenicity so markedly for dogs and mice. In short, there is evidence that mouse brain culture virus immunizes both mice and dogs with a minimum of danger and, similarly, that chick embryo virus can immunize rabbits but not mice and dogs without danger.

It is our opinion, however, that no virulent vaccine, whether containing unmodified or modified virus, should be considered for mass vaccination until efforts to produce effective, non-virulent preparations have failed. The possibly harmful consequences of injecting virulent virus into a dog population cannot be assessed in the laboratory except to state that variations in virus disease-producing potentialities, particularly the changing of laboratory-induced variants back to natural types, are not unknown.

Attention in our laboratory has been concentrated, therefore, on developing an effective non-virulent vaccine. Commercial phenolized preparations have thus far proved generally of little potency. Chloroformized vaccines, on the contrary, give consistently suggestive results, but they are somewhat laborious to prepare and test, and irritative to the vaccinated animals. Ultra-violet light has been shown by several workers<sup>16</sup> to render neurotropic viruses, including rabies, avirulent with accompanying loss of immunizing potency. Tests from our laboratory,<sup>17</sup> however, showed that by proper exposure of rabies virus to ultra-violet light, virulence may be destroyed, yet immunizing potency retained.

Our first irradiation experiments were carried out with culture virus—1.5 cc.

of this material, suitably irradiated, was found to immunize mice against at least 10 to 100 intracerebral, and 32 to 64 intramuscular doses of virulent virus.

Lately Kligler and Bernkopf report that 1.5 cc. of formolized culture virus given intraperitoneally protects about 50 per cent of mice against an intracerebral injection of rabies virus.<sup>18</sup>

The next step in our experiments was to determine the minimum quantity of vaccine required in terms of mouse intracerebral lethal doses for a given species of animal. Repeated tests showed that for mice 1 cc. containing 50,000 mouse intracerebral doses, properly irradiated, gave good protection, whereas less than this amount, though sometimes effective, was not consistently so.

Similarly, for beagle dogs weighing approximately 500 times as much as mice, 500 times the mouse dose, or 500 cc., was required. Seventy-five cc. failed to immunize them. Apparently there is a relationship between weight of animal and number of mouse doses of irradiated virus required.

The problem, therefore, became one of securing a source of virus containing a greater number of mouse doses per cc., preferably at least 10,000,000. Attempts to increase the virulence of the culture virus have thus far failed, but by concentrating it tenfold in a freezing and drying apparatus, we found that 0.15 cc. gave mice as adequate protection as 1.5 cc. of unconcentrated vaccine. This concentrated vaccine, though effective in mice, would need to be given to dogs in doses as large as 50 cc. to furnish the necessary number of mouse doses.

Meanwhile we turned to infected mouse brain as a source of virus. Using this material, which is fatal through the  $10^{-7}$  dilution, Dr. Casals found that if a 1 per cent suspension is centrifuged and the sediment discarded, a lightly opalescent supernatant results which

can be rendered non-virulent in less than 30 minutes by ultra-violet light. This material, in a single injection of 0.1 cc. containing originally about 50,000 doses, immunizes mice adequately. Further experiments with it are in progress.

In conclusion, there is now available a practical, quantitative method for measuring the immunizing potency of vaccines. This method might well be used to standardize vaccines by requiring that 3.0 cc. of a preparation diluted 10 times and given in single or multiple doses immunize mice against at least 100 intracerebral lethal doses of test virus. Finally, it is encouraging to know that several groups of workers are developing and testing new preparations on the assumption that, given the proper material and technic, immunization against rabies with vaccines is a definite possibility.

#### REFERENCES

1. Webster, L. T., and Dawson, J. R. *Proc. Soc. Exper. Biol. & Med.*, 32:570, 1935.
2. Webster, L. T. *A.J.P.H.*, 26:1207, 1936.
3. Leach, Charles N. *A.J.P.H.*, 28:162, 1938.
4. Carnes, H. E., Sellers, T. F., and Sunkes, E. J. *J. M. A. Georgia*, 27:412, 1938.
5. Denison, G. A., and Leach, C. N. *A.J.P.H.*, 30:267, 1940.
6. Webster, L. T. *Am. J. Hyg.*, 30:113. Sec. B, 1939.
7. Webster, L. T. *J. Exper. Med.*, 70:87, 1939.
8. Webster, L. T. *J. Exper. Med.*, 71:719, 1940.
9. Wyckoff, R. W. G., and Beck, C. E. *J. Immunol.*, 39:17, 1940.
10. Habel, Karl. *Pub. Health Rep.*, 55:1473, 1940.
11. Leach, C. N., and Johnson, H. N. *Am. J. Hyg.*, 32:46. Sec. B, 1940.
12. Habel, Karl. *Pub. Health Rep.*, 55:1619, 1940.
13. Webster, L. T., and Clow, A. D. *Science*, 84:487, 1936.
14. Webster, L. T., and Clow, A. D. *J. Exper. Med.*, 66:125, 1937.
15. Webster, L. T. *A.J.P.H.*, 28:44, 1938.
16. Kligler, I. J., and Bernkopf, H. Third International Congress for Microbiology, *Report of Proceedings*, 1940, p. 323.
17. Dawson, J. R. *Arch. Path.*, 29:721, 1940 (Abstract).
18. Sankaran, G., and Beer, W. A. *Indian J. M. Research*, 22:581, 1935.
19. Gordon, J. E., and Hughes, T. P. *J. Immunol.*, 30:221, 1936.
20. Toomey, J. A. *Am. J. Dis. Child.*, 53:1490, 1937.
21. Hodes, H. L., Lavin, G. I., and Webster, L. T. *Science*, 86:447, 1937.
22. Hodes, H. L., Webster, L. T., and Lavin, G. I. *J. Exper. Med.*, 72:437, 1940.
23. Kligler, I. J., and Bernkopf, H. *J. Bact.*, 39:68, 1940 (Abstract).

# Typhoid Typing in the Western States\*

ALFRED S. LAZARUS, PH.D.

*Instructor in Bacteriology, University of Colorado School of Medicine and Hospitals, Denver, Colo.*

THE method of typing various strains of *Eberthella typhosa*, as developed by Craigie and Yen in 1938,<sup>1</sup> offers interesting possibilities to the health officer, the sanitarian, the epidemiologist, and others interested in the control of typhoid fever. The survey reported here was undertaken in an effort to bring the advantages of this method to the attention of those most likely to benefit by its use.

Time does not permit a complete discussion of the details of the typing method. The procedure is based on the use of a particular strain of bacteriophage, which is not only specific for the Vi form of *Eberthella typhosa*, but also exhibits a selective affinity for the strain on which it is propagated and for epidemiologically related strains. By selective propagation of this bacteriophage on various strains of *Eberthella typhosa*, Craigie and Yen,<sup>1-5</sup> have shown that it is possible to divide freshly isolated cultures into a limited number of readily distinguished types, which have been designated by the letters A to M inclusive, with the exceptions of I and K. Types B, D, E, and F have been subdivided, and these sub-types are designated by numbers following the type letter.

For details of the typing method, reference is made to the original publication of Craigie and Yen.<sup>1</sup> Figures 1, 2, and 3 demonstrate the appearance of typical plates.

It must be emphasized that cultures can be typed only when in the Vi form, which means that the percentage of successful typings depends on the handling of the cultures prior to submission for typing. Freshly isolated cultures which have not undergone prolonged incubation or numerous transfers should yield a very high percentage of successful typings.

In addition to the Vi and W forms, Craigie and Yen have described the so-called imperfect V form, which is a typical Vi form in every respect except

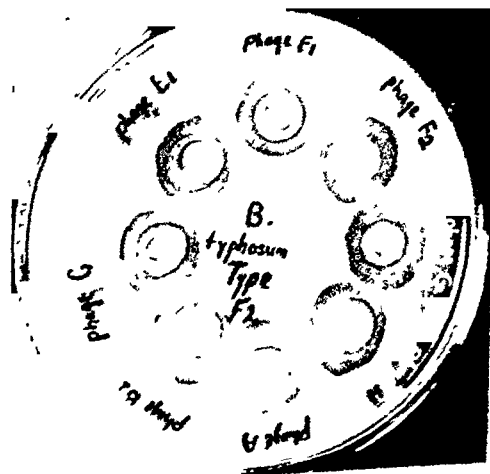


FIGURE 1—Typical Vi Form, Type F<sub>2</sub>

\* Read at a Joint Session of the Laboratory, Food and Nutrition, and Epidemiology Sections, of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

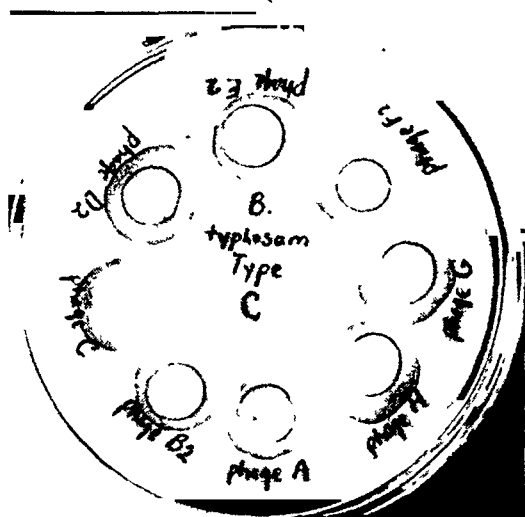


FIGURE 2—Typical Vi Form, Type C, Showing Nonspecific Plaques Usually Produced on This Type

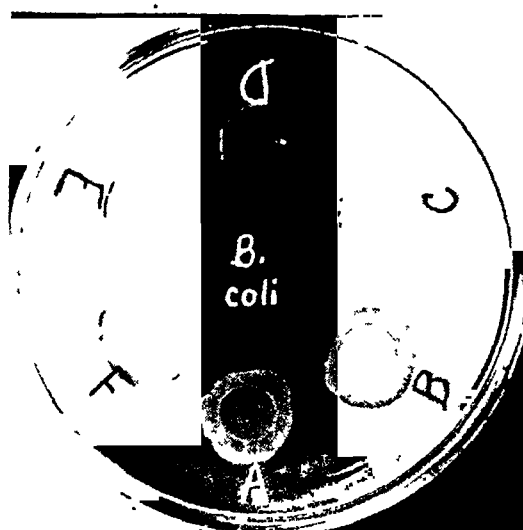


FIGURE 3—*B. coli*, Showing Failure to Respond

sensitivity to the typing phages. These forms cannot be typed at present, but newer procedures may make it possible to classify these strains in the near future.

This study, with material obtained through the courtesy of the many co-operating laboratories, has not only demonstrated many of the uses of the typing method, but has also given some indication of the distribution of the various types throughout the west. Table 1 shows the distribution of 465 cultures studied in the period from November 1, 1939, to September 1, 1940. It will be noted that types B<sub>3</sub>,

B<sub>4</sub>, D<sub>3</sub>, E<sub>2</sub>, F<sub>2</sub> and G have not as yet been encountered in the area being studied. The figures in Table 1 also demonstrated that 96.9 per cent of the typed cultures fall into the 6 main groups A to F.

Since in many cases more than one culture was received from the same individual, Table 2 is included to show the distribution of the individual patients by states. It will be noted that 86.5 per cent of all those patients studied have been successfully typed, while the remainder of those investigated were represented by W or imperfect V form cultures. The per-

TABLE 1  
Distribution of Cultures by States

	Type												Imp. V	W	Total
	A	B <sub>1</sub>	B <sub>2</sub>	C	D <sub>1</sub>	D <sub>2</sub>	E <sub>1</sub>	F <sub>1</sub>	H	J	L	M			
California	24	2	6	10	1	1	28	42	..	2	1	1	16	10	144
Colorado	..	3	1	2	..	..	6	1	..	..	..	..	2	..	15
Idaho	..	..	..	1	..	..	..	1	..	..	..	..	..	..	2
Montana	..	1	4	1	..	..	2	1	..	1	..	..	..	4	14
Nebraska	..	..	..	1	..	..	2	..	..	..	..	..	..	..	3
Nevada	..	..	..	2	..	..	..	..	..	..	..	..	..	..	2
New Mexico	8	7	28	3	7	..	42	16	..	1	..	..	13	1	126
Oregon	25	1	4	11	6	..	20	18	..	4	..	..	6	1	96
Utah	1	..	2	10	3	..	..	..	..	..	..	..	..	2	18
Washington	7	1	2	2	4	..	9	..	..	1	..	..	6	10	42
Wyoming	..	..	..	..	..	..	..	..	1	..	..	..	1	1	3
Totals	65	15	47	43	21	1	109	79	1	9	1	1	44	29	465

TABLE 2  
Distributions of Individuals by States

	Types												Imp. V	W	Total	Per cent Typed
	A	B <sub>1</sub>	B <sub>2</sub>	C	D <sub>1</sub>	D <sub>2</sub>	E <sub>1</sub>	F <sub>1</sub>	H	J	L	M				
California	21	2	6	9	1	1	21	39	..	2	1	1	10	10	124	84
Colorado	..	3	1	1	..	..	5	1	..	..	..	..	2	..	13	85
Idaho	..	..	..	1	..	..	..	1	..	..	..	..	..	..	2	100
Montana	..	1	3	1	..	..	1	1	..	1	..	..	..	2	10	80
Nebraska	..	..	..	1	..	..	2	..	..	..	..	..	..	..	3	100
Nevada	..	..	..	2	..	..	..	..	..	..	..	..	..	..	2	100
New Mexico	8	6	20	3	5	..	..	11	..	1	..	..	..	1	89	96
Oregon	17	1	3	10	4	..	14	15	..	3	..	..	3	5	73	92
Utah	1	..	1	10	3	..	..	..	..	..	..	..	..	2	17	88
Washington	7	1	2	2	4	..	9	..	..	1	..	..	6	10	42	62
Wyoming	..	..	..	..	..	..	..	1	..	..	..	..	1	..	2	50
Totals	54	14	36	40	17	1	83	68	1	8	1	1	27	26	377	86.5

centage of successful typings should increase as the need for submitting freshly isolated cultures becomes more generally recognized.

Numerous possibilities regarding the application of the typing method are readily seen. Some of the major facts regarding the uses of the method are as follows:

1. All cases arising from a carrier will show the same type as the carrier, and therefore the same type as each other.
2. The typing of all known carriers in a given area will permit the immediate elimination of some carriers from consideration and the investigation of the activities of others when typhoid cases occur in the same district.
3. In any outbreak, the typing will show the minimum number of sources involved. The typing will often allow the detection of two or more concurrent outbreaks, and will also permit the separation of endemic and epidemic cases.
4. Typing of all cultures from a given outbreak will usually determine whether the epidemic is due to a carrier or to sewage pollution. If all cases show the same type, a carrier is probably responsible; if a variety of types is encountered, sewage contamination is probably responsible for the outbreak.<sup>6</sup>
5. Complete typing studies in a given outbreak will indicate definitely whether all sources of infection have been discovered.

Additional applications and possibilities will undoubtedly occur to the minds of those interested in this method.

A brief discussion of some actual

uses of the typhoid typing method may be of interest.

*Example 1*—An outbreak of typhoid fever in Los Angeles City and County in the fall of 1939 was investigated by combined epidemiological and typing studies. The typing results showed a great preponderance of a single type, accompanied by scattered cases of non-related types. On the basis of the laboratory investigations, which were carried out in Denver without any epidemiological information whatsoever, it was possible to predict that the outbreak was due to a carrier discharging type F<sub>1</sub> organisms, and it was also possible to separate most of the sporadic endemic cases from the main outbreak. Epidemiological studies were in almost complete agreement with laboratory reports. When the carrier was located he was discharging the same type organisms as had been predicted. This was the first reported application of concurrent epidemiological and typing studies in a typhoid fever outbreak in the United States. It is regretted that the untimely death of Dr. Hyman Vener of the Los Angeles City Health Department prevented a complete discussion of this interesting outbreak at this time. The epidemic was caused by chocolate eclairs apparently contaminated by an intermittent carrier who cleaned the utensils used in pre-

paring the eclair fillings. The details of the outbreak are available in *Bulletin No. 64* of the Los Angeles City Board of Health Commissioners.

*Example 2*—A mother, aged 43, developed typhoid fever about 3 weeks after the last reported case in the Los Angeles outbreak. Her 5 year old son had been ill with what had been diagnosed as paratyphoid fever, on the basis of reports from a private laboratory. Investigation disclosed that the mother had nursed the child during the illness and while changing the child's shirts and gowns, she had placed in her mouth the safety pins used on his bedclothes. Cultures isolated from the mother showed the same results as those obtained from the carrier responsible for the contaminated eclairs. The mother denied eating eclairs, but the son remembered having eaten some. The story then became clarified. The son had developed a missed case of clinical typhoid and had secondarily transmitted the infection to his mother. Bacteriophage typing disclosed the relationship to the epidemic, and cleared up the epidemiology of these two cases.

*Example 3*—Type J cultures were received within a short time from the southern part of Washington and the northern part of Oregon. Due to the rarity with which this type has been encountered and the almost simultaneous arrival of the cultures, it was suggested that the matter be investigated more closely. It was found that the Washington culture was from a carrier and the Oregon culture was from a clinical case, the grandson of the carrier, who had visited his grandfather within the possible incubation period. This example points out the value of a centralized typing laboratory in correlating reports between states.

*Example 4*—A rancher in Washington sold milk to a confectionery. Clinical cases of typhoid developed in two purchasers of the milk and investi-

gation showed the rancher to have been a typhoid carrier. The clinical cases and the carrier were typed by the bacteriophage method, and the results showed all the cultures to have been the same type. Such evidence is almost conclusive proof of the source of the cases, which is of course a matter of interest to the health officer and others.

*Example 5*—A resident of eastern Washington visited a friend in Seattle. On her return to her own home clinical typhoid developed. The Seattle friend was shown to have been a carrier. Both the carrier and the case gave the same results by the bacteriophage-typing method. In this example the typing reports aided in definitely establishing the source of the clinical case.

The above examples, chosen from many available, not only furnish additional evidence regarding the stability of types but also point out some of the ways in which the typing method may aid in establishing the source of infection in a given case, which is of course a matter of primary importance to the health department concerned. At the present time, it is not practical for the laboratories concerned to do their own typing, largely because of the lack of trained personnel. However, the method is easily learned and it is hoped that it will eventually be applied as routine procedure. Another alternative is the establishment and support of a centralized bureau for the typing and control of all known carriers, with financial aid supplied by the states interested or by the federal government. At present, typhoid strains will be typed and reported as promptly as possible. Data indicating the source of the culture and the status of the patient would be helpful in future evaluations of the method.

In summarizing, it is felt that the typhoid typing method of Craigie and Yen is proving to be a valuable and

sensitive tool in the control of typhoid fever. Properly applied, the method can be a useful adjunct to epidemiological studies.

In a survey of 465 cultures submitted from 11 states, the typing method has yielded valuable information in numerous cases. The procedure, when applied and used intelligently, is expected to do much to reduce the incidence of a once serious disease. The future progress of this work is obviously dependent on the aid and coöperation of all concerned.

## REFERENCES

1. Craigie, J., and Yen, C. H. The Demonstration of Types of *B. typhosus* by Means of Preparations of Type II Vi Phage. *Canad. Pub. Health J.*, 29, 9:448-463 (Sept.), 1938; 10:484-496 (Oct.), 1938.
2. Craigie, J. Notes on the Typing of *B. typhosus*, with Special Reference to Types E<sub>2</sub> and F<sub>2</sub>. *Canad. Pub. Health J.*, 30, 1:37 (Jan.), 1939.
3. Craigie, J. Further Observations on Types of *B. typhosus*. *Canad. Pub. Health J.*, 31, 1:18-20 (Jan.), 1940.
4. Yen, C. H. Bacteriophage Typing of *B. typhosus* Isolated in Peiping. *Proc. Soc. Exper. Biol. & Med.*, 41, 1:162-165 (May), 1939.
5. Craigie, J. Personal Communication to the Author.
6. Brandon, Kenneth F. The Application of Phage Typing to Strains of *B. typhosus* Recovered from Typhoid Fever. *Canad. Pub. Health J.*, 31, 1:10-12 (Jan.), 1940.

# Some Trends in Public Housing\*

L. M. GRAVES, M.D., AND ALFRED H. FLETCHER, F.A.P.H.A.

*Superintendent, Department of Health, Memphis, Tenn.; and Associate in Sanitary Engineering, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.*

IT is possible to look back over two and a half years of public subsidized housing progress since the first project was completed in Memphis and to note some trends in accomplishments and policy as evidenced by the development of the program.

The influences motivating the initiation of the subsidized housing program under the PWA Housing Division were unemployment and the desire to stimulate the building industry. Housing for low income families was incidental. The projects were designed and built not to rent at definite rates in order to house a specific income group but to meet certain standards of design. Grants-in-aid and generous annual rental subsidies kept the necessary rentals at reasonable figures. The objective of providing housing for the lowest income group, upon which the program was largely justified, was not fully realized.

It was considered expedient, however, to support, promote and extend this program which was the only one promising something definite in the way of improved housing conditions for the poor, without waiting many years for a rise in the wage rates of the low income group. The program was continued under a new agency, the U. S.

Housing Authority, and through the Local Housing Authorities.

There is rather general agreement that the dominating force in the program of the Housing Authority today is the desire to house adequately the lowest income group, and every effort is being made to lower the maintenance and amortization costs of new projects. Much progress has been made in this direction during these past two years.

## INCOME LEVEL OF SELECTED TENANTS REDUCED

To compare two projects built in Memphis, there have been selected the first one built under the old PWA Housing Division program and the first to be designed and constructed under the U. S. Housing Authority program which is the third one for the city. The following table shows the rents and incomes of the families displaced by slum clearance and the rents and incomes of the selected tenants.

The downward trend of incomes of selected tenants is very marked. It seems significant that while the selected tenants for the third project were in approximately the same rental group as those selected for the first project, the Local Authority chose a group having an average income of only \$65.82, while for the first project the average income of selected tenants was \$94.10.

It is difficult to state accurately the economic level from which the third or

\* Read before the Engineering Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 10, 1940.



TABLE 1

*Comparison of Average Rents and Incomes of Selected Tenants as Shown on Their Application at Time of Selection, and Displaced Slum Dwellers at Time They Were Moved Out for the Razing of the Slum Dwellings in the First and Third Government Subsidized Housing Projects. Memphis, Tenn.*

(Lauderdale Courts was built under the PWA Housing Division program and Lamar Terrace was designed and built under U.S.H.A. program. Both are for white tenants.)

	<i>Lauderdale Courts (Completed 1938) (1st Project)</i>		<i>Lamar Terrace (Completed 1940) (3rd Project)</i>	
	<i>Selected Tenants at Time of Selection</i>	<i>Slum Dwellers at the Time They Were Moved Out</i>	<i>Selected Tenants at Time of Selection</i>	<i>Slum Dwellers at the Time They Were Moved Out</i>
Average Rent	\$21.09	\$ 6.70	\$24.25	\$ 9.37
Average Income	94.10	34.41	65.82	56.61

Lamar Terrace Project group was picked but in the 1937-1938 survey it was shown that approximately 30 per cent of the population made less than \$60.00 a month. Further reductions in rent are necessary either by similarly reducing maintenance and amortization costs or by increasing subsidies, if the bottom income group is to be reached by subsidized housing in Memphis.

It is believed that the group which should be benefited by subsidized housing programs should be nearer to the top of the bottom 10 per cent than to the top of the bottom 30 per cent.

#### RENTAL TRENDS OF SELECTED TENANTS

The trend of rents being paid by selected tenants, at the time of appli-

cation for public housing, has been upward. This may have several explanations. Rents generally during the past few years have increased. In addition, the policy of the Local Housing Authority has been to select tenants in so far as possible on the basis of need as indicated by low incomes and poor housing. The families selected, although living in substandard housing, were undoubtedly trying to obtain the best housing possible for their limited incomes as shown by the high percentage of their salary going for rent (Table 1). The new rents for the group of tenants selected for the third project are less than the rents which they were paying before selection. This is most desirable for them as it im-

TABLE 2

*Comparison of Rent and Income Schedules for Lauderdale Courts and Lamar Terrace*

No. Persons	No. Rooms	<i>Shelter Rent Not Including Utilities</i>		<i>Average Annual Income at Time of Admission</i>	
		<i>Lauderdale</i>	<i>Lamar Terrace</i>	<i>Lauderdale</i>	<i>Lamar Terrace</i>
2	3	\$13.50	\$13.35	\$828.00	\$766.00
3	3½	16.85	13.60	912.00- 948.00	836.00
4	4½	21.75	14.85	984.00-1,020.00	905.00
5	5½	.....	15.85	1,056.00	968.00
6	5½	25.00	15.85	1,104.00	1,030.00

mediately makes available more money for other necessary expenses, such as food, clothes, and medical care. The savings in rent and utility costs in some cases will amount to as much as \$15.00 a month. For such low incomes, these savings are probably as important as the better living quarters.

In the matter of rentals charged in the first three projects, there has been a gradual reduction. The same first and third projects as in Table 1 are shown in Table 2 with the rentals by size of apartment. There is a marked reduction particularly in the rentals for the larger units, which means for the larger families.

The Lauderdale, or first project schedule, has recently been revised so that the top rental instead of being \$25.00 is \$20.10. This provides a desirable reduction in rents for large families, with a smaller rent differential between small and large families.

#### MAKE-UP OF BOTTOM INCOME GROUP

A study was made of the people living in a sample of the poorest blocks of the city to classify the workers on the basis of employment. Among the colored, 1,661 were common laborers, porters, and store helpers, 380, charwomen or cleaners, 231, cooks in public places, 173 were washing clothes (not in a laundry), 171 were porters not in stores, and 158, truck drivers. Among the whites, 180 were classified as common laborers, porters, and store helpers, 18 as domestic servants, 16 as truck drivers, and 15 as salespeople in stores. This represents a total of 2,159 families, or about 2.5 per cent of the population of Memphis. It is a sample of the very bottom income group.

This enumeration of occupations of the poorest group is made only as a help in visualizing what these people do for a living. It is recognized of course that there are some too old to work, some feeble-minded, some cripples

and invalids who can never be considered eligible for government subsidized housing projects. It would seem that the percentage in this unemployable group, however, is not 30 but possibly nearer 10 or even less.

#### VACANCY AND DEMOLITION

Demolishing dilapidated dwellings as an effective means of improving housing conditions in a city has its limitations. In Memphis the percentage of vacancies in substandard housing areas has decreased progressively from 5.65 per cent in 1936 to 4.59 per cent in 1938 and to 1.5 per cent in 1940. A low percentage of vacancies makes a strong demand for housing and always results in rental increases. This is most undesirable unless there is a corresponding improvement in the housing furnished. A healthy vacancy ratio promotes competition and tends to adjust the rents to a fair figure. In any program using legal enforcement measures for improving the condition of dwellings, one of the major devices used is condemnation. A shortage of housing particularly in the slums, however, makes this device difficult to use. This caution applies more to the local government in the housing enforcement programs, although it is possible that the requirement of the U. S. Housing Authority may stimulate a wholesale condemnation campaign on the part of several city departments with unfavorable results. Under certain conditions, a rehabilitated dwelling is worth as much or more to the community than the same house demolished.

In the use of demolition for clearing slums, it is necessary to coordinate that action with the local relief administration in order that families which might otherwise suffer hardship through a thorough-going enforcement of existing demolition legislation will receive assistance through rental aid where needed. The difficulties in this pro-

gram will be the large number of people who will need this assistance and the existing policy of many—if not most—cities of not furnishing rents for minimum standard homes.

#### DEVELOPMENT OF A COMPREHENSIVE CITY HOUSING PLAN

Housing is related to health, and it is certainly desirable if not essential that health officials be prepared to influence properly any housing plan for the optimum benefit to public health. There is no doubt that all health departments are interested in securing and maintaining sanitary toilet facilities with safe water, safe waste disposal, and screens (especially in malarious regions). Leaking roofs, broken windows, rotten steps, poor ventilation, and lack of sunlight are also of concern to health workers, and most if not all health departments are trying to do something about these conditions where they are bad.

A study of the housing problem, in an objective way, would seem to indicate, however, that because of the lack of sufficient income of the tenants nothing significant or lasting can be accomplished through the usual health department enforcement program in the real slums even though carried on with determination. The local departments of health are perhaps the only agencies in the field today that can demonstrate this for their own cities and that can conduct housing studies to secure the necessary facts upon which to develop a sound housing plan for the city. Such a plan can include enforcement for blighted areas only where a large percentage of the population has sufficient income to finance needed repairs and maintenance.

Subsidized housing should serve those below the economic rent level, leaving the lowest 10 or 15 per cent or more as a relief problem. There is serious doubt in the minds of many as to

whether it will be possible to reach lower than the cream of the low income group of most urban communities. To do this it will be necessary to change the requirements for tenant selection if the average slum dweller whether sick or healthy, whether a good credit risk or a poor one, is to be included. This may or may not make it necessary to lower the maintenance and amortization costs so as to lower the income standards for tenant eligibility. There is no doubt that the very bottom 5 or 10 per cent must be taken care of by either some form of family rent assistance or in some type of institutional care if they are to live in minimum standard housing.

Possibly the ultimate solution to housing the slum dweller in minimum standard housing will be in extending sufficient rental subsidy direct to those below a certain income level to make it possible for them to live in minimum standard housing as approved by municipal health departments. Such a plan would seem to go more to the root of the problem and would provide reasonably decent standards for a much larger number of tenants, at the same cost, than under the present subsidized housing building program. It would certainly simplify the problem of enforcement as no property owner would be justified in failing to maintain a minimum standard house because he would be receiving an economic rent. A combination of the present subsidized housing program with a coordinated direct-relief rental subsidy program would certainly stimulate an interest in the housing problem on the part of enforcement and relief agencies.

The solution to the problem is not simple but extremely complex. It is primarily a social and an economic problem, and its solution demands a sound diagnosis.

It might be stressed here that the sanitation programs of many city

health departments must be strengthened by qualified leadership before much can be done in analyzing the problem and exerting the desirable leadership in this phase of constructive city planning.

#### POPULATION SHIFTS

The question of population shifts is a difficult one to discuss without accurate and detailed surveys, and then only in a limited way as indicated by the specific project studied. In the three projects already completed and occupied, a number of factors have been responsible for several types of shifts of the population. The shifts at any one project may and usually do differ from the shifts at other projects.

An attempt is here made to list the several types of shifts noticed for the first three projects.

*First*—Shifts due to the group selected for the new project having a higher income than those displaced by the project by demolitions.

*Second*—Those due to displacing colored families with white families.

*Third*—Shifts in tenants due to demolitions or increases in rents for adjacent property following major improvements brought about either by legal enforcement demands made by the health or building departments on the owners or voluntarily due to the general improvement in property values after the new project is occupied.

*Fourth*—Those due to dwellings being converted to business uses or business property converted to dwellings because of the increase in buying power of the new tenants in the good housing project or to the forcing out of business use of dilapidated property and rebuilding residential property in the rezoned area.

#### DIXIE HOMES

In the first Negro project under the old PWA Housing Division program

there have been no noticeable changes of any kind taking place since its completion about two years ago. There was, however, an almost 100 per cent example of slum shifting due to the large difference in incomes of the displaced tenants and the selected tenants.

#### SLUM SHIFTING

It may be of interest to speculate on where displaced tenants go. It is felt that they seek houses at least as good and if possible a little better than those they leave. This may not be possible if there is a shortage of homes for this rental group. However, it is believed that the studies in Memphis indicate that in time the type of housing these tenants live in will be or will gradually revert to about the same types as they were forced to leave. If the houses are slightly better due to better rents having been collected to date, then the houses will be allowed to run down due to a decrease in return to the owner. This process may be referred to as slum shifting. To have slum clearance it is necessary to select tenants who are in the same income group as the displaced tenants of the demolished slum.

Out of 148 families facing the project, 117 stated recently that they would like to live in the project if they could. These people were in approximately the same economic class as the ones displaced. The remaining 31 families stated that they definitely would not want to live in the project although they live in typical slum houses and must know of all the conveniences in the project houses.

Another point of interest is that in approximately 50 per cent of the houses there has been an increase in rent averaging \$2.00 a month per family. In the other half there has been no change in rent. Only 16 of the 148 houses facing the project had repairs or improvements made on them during this

two year period. In every case where improvements were made there was an increase in rents.

#### LAUDERDALE COURTS

In the first white project under the old PWA Housing Division program there have been several noticeable changes. Some 50 dilapidated Negro shacks were condemned and torn down because of their objectionable character and their location just across the street from one side of the new project. A new modernistic looking doctor's office was constructed across the street on another side of the project, and on the third side a new, modern grocery store was built and is doing a good business. No study was made to determine the effect of this project on the drug and other grocery stores near by, but undoubtedly they are doing more business because of the increased buying power of the neighboring population. No evidence of this increased business, however, is shown through improvements in the building structures themselves except in the two specific instances cited here.

#### LAMAR TERRACE

In the third project (Lamar Terrace), the first under the U. S. Housing Authority program, 299 families (practically all colored) were displaced by 633 white families. The original colored slum area formed a long narrow wedge extending into a very desirable white residential area. The presence of the colored in this area affected the surrounding property in addition to the blighting effect of the run down, dilapidated dwellings and business property.

One type of shift noted was a perfectly natural moving of the displaced colored families into a white, blighted area which extended into the main slum and colored section of the city not far from this project. There was con-

siderable reaction to this from white families who had lived there for many years. The housing studies and map classifying the slum areas into various degrees of "slumness" indicated very definitely that this trend was inevitable but was taking place within a few days instead of over a period of years. This is an example of slum shifting in a sense, but in this case desirable and logical under the circumstances.

Another type of shift which is to be expected is the gradual replacement of a small poor class Negro business section with a new white business or residential development to serve the 633 new white families moved in.

The white families coming into the new project came from all parts of the city with none, of course, from the original area as those there were colored and not eligible for this project.

Dilapidated dwellings housing 46 colored families were left at the tip end of a wedge which extended into a white residential area like a peninsula. These were left out of the area which was cleared because of the necessity of cutting down on its size. This island was too noticeable to be forgotten however. Through neighborhood agitation and with the aid of the city officials who were disappointed by the need for omitting this small area from the housing project, this area was purchased and will be converted into a park and playground. The need for a civic real-property improvement agency closely correlated with the tax delinquent department, the housing authority, and other interested agencies, with legal machinery for buying and redeveloping small isolated rotten spots is illustrated here.

#### CONCLUSIONS

1. There has been a decided shift in the primary objective of the old PWA Housing Division program and of the U. S. Housing Authority program from

one of ending unemployment and stimulating the building industry to one of lower rents within the paying ability of slum dwellers.

2. An effort should be made by health departments to study objectively the social and economic factors responsible for the housing problem so as to be able to formulate a comprehensive public health housing policy.

3. To develop a comprehensive housing program requires the coöperation of the agencies concerned with housing such as the city planning commission, the housing authority, social agencies, the department of health, the building department, relief agencies, the department responsible for tax delinquencies and relief agencies.

4. Vacancy ratios and demolition as a device in enforcement programs are intimately related, and a program of

condemnation and demolition must be carried out according to a plan in order to get the desired results.

5. It is believed that the type of questions now confusing the broad problem of housing would gradually fade from the picture and new and more specific problems with indicated courses of procedure would come into view under a comprehensive plan of attack.

6. An attempt has been made to discuss several types of population shifts which take place when a subsidized housing project is built in slum cleared areas.

NOTE: The authors wish to acknowledge the work of Wilbert H. Grishan, Director, Division of Housing and Malaria of the Memphis Health Department, and of J. E. Moon of the same Division in directing and tabulating the field studies upon which this paper is based.

# Massachusetts State Program for the Care of Prematures\*

FLORENCE L. MCKAY, M.D.

*Assistant Director, Division of Child Hygiene, Massachusetts Department of Public Health, Boston, Mass.*

A PROGRAM for the care of prematurely born infants in a state department of public health is an innovation in the activities of a division of child hygiene. The pattern for the Massachusetts program initiated in 1937 was that established for Chicago by Dr. Julius Hess and others.

## HOSPITAL CENTERS FOR THE CARE OF PREMATURE INFANTS

*Establishment*—The Massachusetts program started with the establishment of hospital centers for the care of premature infants. The basis of this program is the superiority of adequate hospital care of prematures over such care in the average home. As this was one of the many activities of the Division of Child Hygiene, the establishment of these centers extended over a considerable period and was completed in October, 1938.

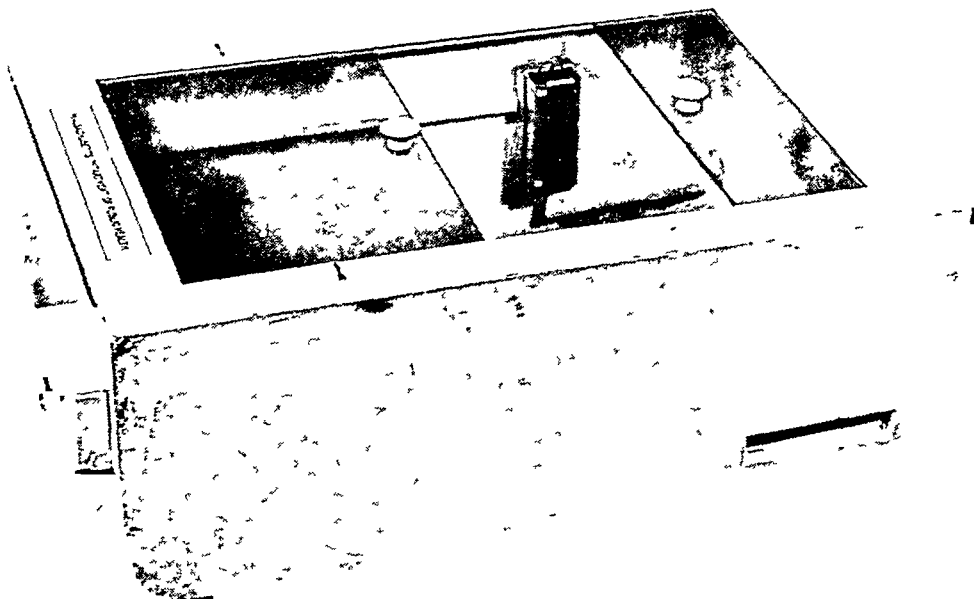
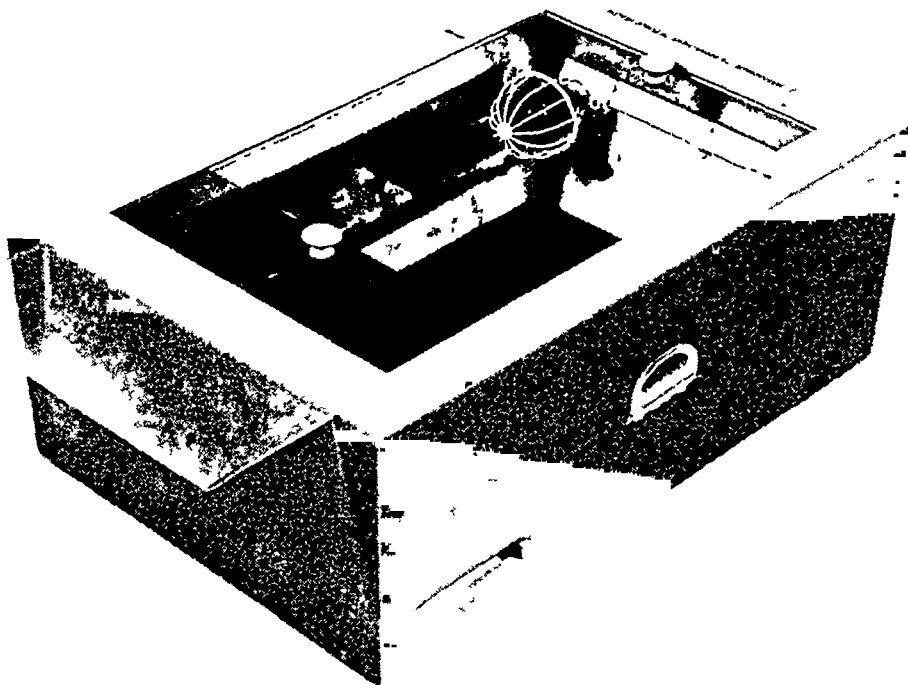
The establishment of the centers (48 outside of the City of Boston) was done through visits to the hospitals selected, during which the program was discussed with the superintendent, the obstetric and nursery supervisors, and interested members of the medical staff and hospital board. Aside from strategic

geographic location, the standards of work determined the choice of hospitals. In selection we had the assistance of all state organizations concerned with hospitals. After inspection of the nursery and methods of care, the necessary changes in equipment for becoming a center were outlined to the hospital group.

*Improvised Equipment*—At the time of this visit an improvised incubator was demonstrated. This can be built in the hospital for less than \$30. It is a bottomless wooden box which covers the infant in its crib. It is heated by a colored electric light bulb thermostatically controlled, with an open water tank for additional humidity. Covers made of non-breakable, non-inflammable cellulose acetate slide together, or separately, giving sufficiently wide openings so that all care can be given without removal of the infant. Although most hospitals use this, many have commercial incubators in addition.

A carrying basket was also demonstrated. This is made from a picnic basket lined with six layers of newspaper. The premature infant, wrapped in blankets and surrounded by hot water bottles, the heat from which is held in by an enveloping blanket, can travel safely to the hospital in such a basket. Many of the hospitals provide this basket as they are sometimes

\* Read before the Maternal and Child Health Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.



TWO VIEWS OF AN IMPROVISED INCUBATOR—MASSACHUSETTS  
DEPARTMENT OF PUBLIC HEALTH





IMPROVISED PREMATURE CARRYING BASKET—MASSACHUSETTS  
DEPARTMENT OF PUBLIC HEALTH

called on to take a premature infant from the home to the hospital. Some use the improvised incubator as an ambulance.

*Standards for Care and Equipment*—The standards for hospital care and equipment of the premature infant were based upon those of the Chicago program.<sup>1</sup> No funds were given to the hospitals. They purchased equipment themselves and made whatever arrangements were necessary for the isolation of prematures. The division did, however, contribute an intensive 2 week refresher course in the care of premature infants conducted by the Boston Lying-in Hospital, the tuition and stipend for each hospital nursery supervisory being paid by the division.<sup>2</sup>

#### THE PREMATURE LAW

After the program was established a law was passed which allows local boards of health to provide transportation of infants weighing 5 lbs. or less who are born in the home to hospitals equipped for their care. If the parents cannot pay for hospitalization the local boards of public welfare are enabled to do so. Later on this law was revised

to include payment not only for prematures born in the home but also for those born in the hospitals, so there is now no economic reason why a premature infant cannot have hospital care.

#### EDUCATIONAL PROGRAM

*Professional*—Along with the hospital center part of the program, educational activities for professional and lay groups were conducted. In cooperation with the Massachusetts Medical Society, lectures on the care of the premature infant were made available. After a hospital center was established each physician in the area served by the hospital was notified of the services available in the newly established center, given a set of printed material on the care of the premature and new-born infant and a copy of the Massachusetts premature law.

Thirteen institutes for public health nurses were held in different parts of the state. The care of the premature infant in the hospital was demonstrated by the nursery supervisors of the hospital centers; care of the premature in the home, before sending it to the hospital, was emphasized; transportation facili-

ties were discussed, and a session was devoted to the health supervision of the premature infant after it leaves the hospital.<sup>2</sup>

After these institutes, the state district supervisory nurses conducted follow-up group discussions of this material with the local nurses. They and the district health officers also consulted the local boards of health and arranged in many communities for carrying baskets to be made available in drug stores, fire departments, visiting nurse association offices, or any place open night and day.

*Lay*—A leaflet for mothers on the care of the premature was issued by the Division and this is now included in all the prenatal letters sent out from the Division and is distributed through prenatal clinics, hospitals, physicians, and nurses. The "Outline for the Conduct of Mothers' Classes" was revised to include material on the care

of the premature. Radio broadcasts and newspaper publicity are a part of the educational program for the laity.

PERSONNEL

The only full-time worker on the program was a public health nursing supervisor of hospital centers trained in the care of premature infants. The Supervising Instructor in Public Health Nursing and the Assistant Director of the Division of Child Hygiene gave part time. Upon the termination of the 3 years' full-time services of the supervisor of hospital centers, supervision of the premature program was transferred to the Supervising Instructor in Public Health Nursing and the state district public health nursing supervisors.

We have been fortunate in having an Advisory Committee which has helped us with plans and with the content of our educational program. This

DEATHS OF PREMATURES IN HOSPITALS  
MASSACHUSETTS, 1937-1939

PREMATURES						
Year	Total Cared for in Hospitals		Deaths No. %			
1937	1831		732 40			
1938	1819		689 38			
1939	1957		705 36			
Year	Born in Hospitals	Deaths No. %		Transferred to Hospitals	Deaths No. %	
1937	1731	686 40		100	46 46	
1938	1658	621 37		161	68 42	
1939	1776	626 35		181	79 44	

TABLE 1

## NUMBER OF PREMATURES TRANSFERRED TO HOSPITALS FOR CARE MASSACHUSETTS, 1937-1939

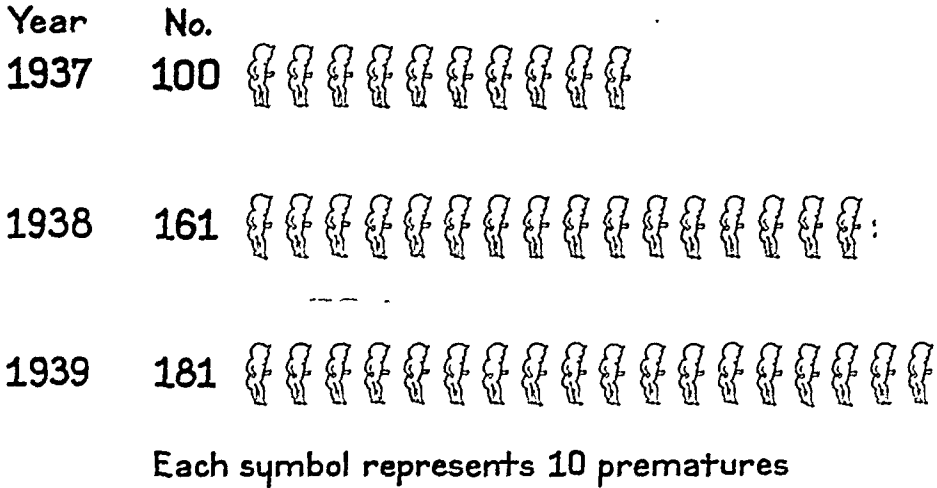
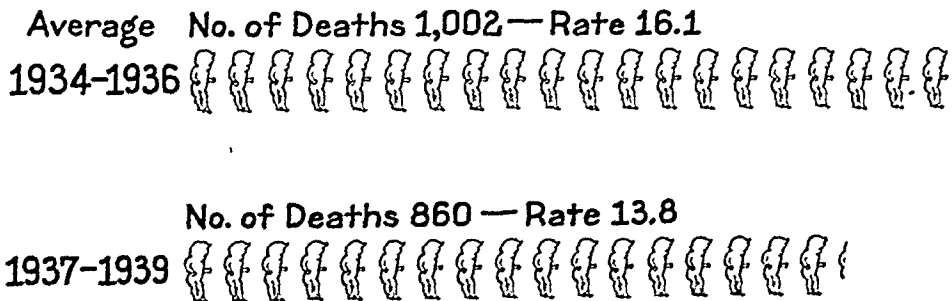


CHART 1

## DEATHS FROM PREMATUREITY MASSACHUSETTS, 1934-1936, 1937-1939

Each symbol represents 50 deaths  
Rate figured per 1,000 live births



PREMATURE CENTERS ESTABLISHED AFTER 1936.

CHART 2

committee is comprised of a pediatrician, obstetrician, a professor of child hygiene, and an engineer who has special knowledge of air conditioning.

#### STUDY OF CAUSES OF DEATHS OF PREMATURES

With this committee we are now trying to introduce a study of the causes of deaths of premature infants. Our objective is not only to secure statistical material but primarily to have an evaluation of each case made by the physician who cares for the infant, followed by an analysis and suggestions by the Advisory Committee.

#### COÖPERATION IN OTHER STUDIES

This division is contributing to a study of diabetic pregnancies conducted by Dr. Priscilla White of the Deaconess Hospital. Dr. White<sup>3</sup> points out that estrogenic therapy in diabetic mothers prevents a large number of premature deliveries. It is hoped that non-diabetic mothers as well will profit by studies of this group. We are learning more and more about the relation of estrogenic substances to pregnancy. Is it possible that premature births will be prevented by endocrine and vitamin therapy, and that the time may come when our premature programs may be discarded?

#### PRENATAL CARE

It is unnecessary to emphasize the importance of the relation of adequate prenatal care to prematurity. A part of our program has been devoted to improving prenatal care given in Massachusetts and also to providing more centers where this care can be made available. We have prepared in mimeographed form—"Outline for the Conduct of Local Prenatal Clinics." With the coöperation of the Harvard School of Public Health, we furnish each year courses for physicians who conduct prenatal clinics. We are now

offering to pay for the conduct of new prenatal clinics by physicians who have completed this course, when the community cannot afford to pay for this service. More emphasis on the establishment of new prenatal clinics is being given, especially in those hospital centers where no clinics are now available.

#### RESULTS

Having had at least one full calendar year of the completed program (1939), we should have statistical material from the hospitals which would give us some idea of the results. A report form is sent out annually by the Department of Public Welfare which licenses the maternity departments of the hospitals, but the returns are not altogether dependable. It is difficult for the hospitals to realize that a premature infant is defined by weight rather than by gestation. We hope in the future to have more reliable figures. Certain figures, however, have been felt to be sufficiently reliable for presentation at this time.

There has been a slight reduction in the death rates of premature infants in this 3 year period. This reduction is in the deaths of premature infants born in the hospital (40 to 35 per cent) rather than in those transferred to hospitals (46 to 44 per cent), as would be expected. There has also been a decided annual increase in the number of premature infants who have been transferred from homes to hospitals for care as can be seen in Chart 1, in which each symbol represents 10 premature infants. In 1939 there was, for example, an increase of 81 prematures transferred to the hospital.

The neonatal death rates in the United States as a whole have been falling in the past few years. Dunham has cited a decrease of 7 per cent in the neonatal death rate of the United States in the period 1935-1938.<sup>4</sup> It is

more than probable that any fall in the death rate from prematurity in Massachusetts is a part of this general national decrease. Thus, with the full realization that the premature program may have nothing to do with the death rates from prematurity in Massachusetts, we present the death rates of the 3 year period previous to the premature program and the death rate of the 3 year period following the beginning of the premature program in Chart 2. Each symbol represents 50 deaths, and there are about 3 fewer symbols in the 1937-1939 group. This indicates a lessening death rate—from 16.1 to 13.8. The number of live births in these two periods was approximately the same.

#### SUMMARY

1. Massachusetts bases its premature program on the superiority of adequate hospital care over care in the average home, and because of this has established 48 hospital centers adequately

equipped to care for premature infants.

2. The nursery supervisors of these hospitals have had special training.

3. The Division of Child Hygiene gives nursing supervision service to the hospital centers.

4. An educational program for physicians, nurses, and the laity has accompanied the premature program.

5. This program emphasizes the improvement of standards and facilities for prenatal care.

6. A study of the deaths due to prematurity is being started.

7. Certain results of the program have been presented.

#### REFERENCES

1. Hess, Julius H., M.D. A City-wide Plan for the Reduction of Deaths Associated with and Due to Prematurity. *J. Pediat.*, 8, 1:104 (Jan.), 1936.
2. Dinegan, Ann W., and Pollock, Madelen P. Care of Premature Infants. *Am. J. Nurs.*, 40, 6 (June), 1940.
3. White, Priscilla, M.D. Prediction and Prevention of Pregnancy Accidents in Diabetes, presented at the Annual Meeting of the American Medical Association, June, 1940. In press.
4. Dunham, Ethel C., M.D., and Bjerman, Jessie M., M.D. The Care of the Premature Infant. *J.A.M.A.*, 115, 9:658 (Aug. 31), 1940.

# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

January, 1941

Number 1

---

H. S. MUSTARD, M.D., *Editor*

MAZŮCK P. RAVENEL, M.D., *Editor Emeritus*

AUGUSTA JAY, *Editorial Associate*

## *Editorial Board*

REGINALD M. ATWATER, M.D.,  
*Chairman, and Managing Editor*

IRA V. HISCOCK, Sc.D.

KENNETH F. MAXCY, M.D.

HENRY E. MELENKY, M.D.

---

## AMERICAN JOURNAL OF PUBLIC HEALTH

VOL. 31, No. 1

JANUARY, 1941

THE Executive Board announces with pleasure and pride the appointment of Dr. MazŮck P. Ravenel as Editor Emeritus of the *American Journal of Public Health* and of Dr. Harry S. Mustard as Editor.

The Executive Board announces with equal satisfaction the appointment of Dr. Henry E. Meleney as a member of the Editorial Board for the year 1940-1941. The Board will announce another appointment to the Editorial Board in the near future.

Associated with the Editorial Board and Dr. Mustard in the conduct of the *Journal* will be a group of Associate Editors among whom Arthur P. Miller and Dr. Leona Baumgartner can be mentioned at this time.

Dr. Ravenel needs no introduction to the readers of the *Journal*. He has served them for sixteen years as Editor and Editor-in-Chief. Dr. Mustard has been a member of the Editorial Board since 1938 and of the Executive Board since 1939. His official position is that of Director of the DeLamar Institute of Public Health, Columbia University. Arthur P. Miller similarly has a long history of service on Association committees, notably on the Editorial Board and as Chairman of the Committee on Fellowship and Membership and of the Committee on Eligibility. Mr. Miller is Senior Sanitary Engineer, District No. 1, U. S. Public Health Service, New York City. Although Dr. Baumgartner has had no official connection with the *Journal* up to this time, she has rendered useful service as an alternate on the Annual Meeting Program Committee and as a member of the Committee on Scientific Exhibits. She is Acting Director, Bureau of Child Hygiene, Department of Health, New York, N. Y.

Dr. Henry E. Meleney and another member to be appointed will join Dr. Reginald M. Atwater, Professor Ira V. Hiscock and Dr. Kenneth F. Maxcy to comprise the Editorial Board for the next year. The Board is entrusted by the Executive Board with the responsibility for maintaining the *American Journal of Public Health* at a high professional standard and as an instrument for reflecting general Association opinion.

The Editorial Board, the Editor Emeritus, the Editor, and the Associate Editors are qualified to serve well the many interests represented in public health work. The allegiance of none is to any one Section, but each has been selected by the Executive Board on the basis of broad knowledge in a number of fields, with special competence in one or more areas.

Vol. 31, No. 1, January, 1941, appears under this direction. There are no startling innovations, nor are any to be expected by readers as the months go on. Those responsible for the editorial policies of the *American Journal of Public Health* have it in mind only to produce a useful magazine of applied public health which with dignity and accuracy represents the American Public Health Association with its membership of 7,000 professional public health workers.

ABEL WOLMAN, DR.ENG.

*Chairman, Executive Board*

*American Public Health Association*

## THE EDITOR EMERITUS

ELSEWHERE in the *Journal* appear personal tributes to a very hale and keen and scholarly Editor Emeritus. We who will attempt to carry on the work which Dr. Ravenel has so well done most heartily concur in these expressions of affection and esteem. But we want to do more than concur. We want, on our own part, to emphasize to the readers of the *Journal*, that the service they have received under Dr. Ravenel's editorship has included an element incomparably finer than anything for which a contract may call. This inestimable quality has sprung from the integrity of the man himself. He carried his own high standards over into his work, and it seems never to have occurred to him that it would have been much easier and more popular to bring these standards down than it was to lift others up. Sometimes those whose articles were under his editorial knife have groaned in anguish, but their wounds have healed cleanly; and generally they admit their literary progeny to have been benefited by the operation.

In addition to a discerning and uncompromising scholarship, Dr. Ravenel brought to bear on his work a fine scientific training and a record of unusual accomplishment. Born at Pendleton, S. C., he attended the University of the South, and received his M.D. degree at the Medical College of South Carolina in 1884, taking first honor. Later he studied in the Laboratory of Hygiene of the University of Pennsylvania as Scott Fellow in Hygiene; in the Pasteur Institute, Paris; the Institute of Hygiene, Halle a/s, Germany; and in the Institute Maragliano, Genoa, Italy. He was assistant demonstrator of anatomy in the Medical College of South Carolina in 1884, taught diseases of children, and practised medicine for six years in Charleston. He has since devoted his time to scientific work and teaching in other places.

He was the first Director of the Hygienic Laboratory of the New Jersey State Board of Health in 1895; Instructor in Bacteriology at the Medical and Veterinary Schools of the University of Pennsylvania in 1896; Bacteriologist of the Pennsylvania State Live Stock Sanitary Board in 1896-1904; Assistant Medical Director and Chief of the Laboratory of the Henry Phipps Institute for the Study, Treatment and Prevention of Tuberculosis in 1904-1907; Professor of Bacteriology at the University of Wisconsin in 1907-1914. From 1914 to 1931 he was Pro-

fessor of Preventive Medicine and Medical Bacteriology, and Director of the Public Health Laboratory, at the University of Missouri.

When the United States entered the World War he was commissioned Major, and later Lieutenant Colonel in the Army Medical Corps, serving at Fort Riley and Camp Funston, Kans., with the medical expedition to Roumania under Colonel (later General) McCaw. Because of the Bolshevik riots the expedition was unable to reach Roumania and was recalled. Dr. Ravenel was then ordered to Camp Kearney, Calif., where he became Camp Surgeon, serving until the end of January, 1919. In the same year he was commissioned Assistant Surgeon General in the Reserve Corps of the U. S. Public Health Service.

His special fields of research are tuberculosis and rabies. His work at the Pennsylvania State Live Stock Sanitary Board, published most completely in 1902, produced the first conclusive proof of the fact, already believed but unproved by other investigators, that the bovine tubercle bacillus was transmissible to man. In connection with these studies, he has done a large amount of work on milk, and was an advocate of pasteurization as early as 1895. Dr. Ravenel is the editor of *A Half Century of Public Health*, for which he wrote the history of the American Public Health Association. He has written numerous papers, dealing chiefly with bacteriology and public health, and chapters for Osler's *Modern Medicine*. His bibliography is carried in this issue of the *Journal*.

Since 1924, he has been Editor of the *American Journal of Public Health*. He is an honorary member of the Philadelphia Pediatric Society; and a member of the National Tuberculosis Association (President 1911-1912); American Philosophical Society; American Public Health Association (President 1920-1921); American Medical Association; International Association Against Tuberculosis; International Committee on Control of Bovine Tuberculosis; American School Hygiene Association; National Committee on Milk Standards; U. S. Live Stock Sanitary Association (President 1911-1912); and Wisconsin Anti-Tuberculosis Society (President 1908-1914). He is also a member of Sigma Xi, Phi Beta Kappa, and Delta Omega. Upon the rich resources of this background he has drawn unstintedly, to the everlasting benefit of the *Journal*, and to the profit of its contributors and readers.

This personality and these seasoned and unusual abilities are happily not to be lost to us. Dr. Ravenel has earned a lessening of the load he has been carrying for the *Journal*, and in this we must, in all fairness, acquiesce. But he will continue to stand by, on call, and will aid us in ways in which only he can serve.

To Mazyck Porcher Ravenel, our Editor Emeritus: Sir, your very good health!

### RAYMOND PEARL, 1879-1940

WHEN in 1918 Raymond Pearl became the first Professor of Biometry and Vital Statistics in the new School of Hygiene and Public Health at Baltimore, his name was almost completely unknown to the members of this Association. He was a biologist whose work had been largely in the field of genetics. He was a biometrician also, but the technics of biometry were only just beginning to be applied to the problems of medical and vital statistics, and their utility was



as yet by no means clear. The appointment was a surprise and as well a shock to the vital statisticians of the country.

The wisdom of the appointment was soon made evident. To the field of medical and vital statistics Pearl gave all the force of his unique personality, and of his great intelligence. He held up to scorn and ridicule the all too prevalent looseness of thought and of statement in current medical statistics. He insisted that his students comprehend the underlying philosophy of modern statistical procedure and master its technics.

His work had profound and permanent effect on the field of medical and vital statistics and on public health in this country. His students occupy important positions. His ideals have become the ideals of American medical and vital statistics. When his work came to an end on November 17, 1940, this Association lost a member of world-wide reputation, and his associates a beloved and honored friend.

A. W. FREEMAN

## A NOTABLE PASTEURIZATION RECORD

THE action of the Provincial Legislature of Ontario in 1938 in making the pasteurization of milk compulsory has attracted wide attention. The progress of this ambitious Provincial program has been well described in a report entitled "Progress in Pasteurization in Ontario" presented before the Canadian Public Health Association by A. E. Berry, Ph.D.\* of the Ontario Department of Health.

Prior to the Act of 1938 which brought all control of pasteurization in Ontario under the Department of Health, there had been permissive laws in effect, but only 50 municipalities out of a total of over 800 had made pasteurization compulsory, although in 15 others the total milk supply was pasteurized without aid of special legislation. Twelve of the 27 cities in the Province had complete pasteurization. This would seem to indicate only a moderate advance in pasteurization under local administration of a permissive nature.

After 2 years of this new legislation, it is significant to note that the 27 cities and 147 towns which automatically came under the Act have achieved complete pasteurization and, in addition, through orders-in-council, all villages of 500 population or over are now included under the Act, and many smaller communities including rural areas are benefiting from the legislation. It is officially estimated that at least 92 per cent of all milk sold in Ontario for fluid consumption is pasteurized. The number of plants under Provincial supervision is more than 800—a figure said to be double that for the remainder of the Dominion.

In addition to achieving an important advance in milk control in Ontario it is believed that this is the first area of its size in the world to make pasteurization compulsory.

According to Dr. Berry's report, this legislation in Ontario has accomplished two important advances: it has removed from local centers the controversy of deciding for or against pasteurization, a decision which formerly was made by

---

\* To be published in *Canadian Journal of Public Health*.

bodies untrained in public health matters; and it created uniform requirements for all pasteurizing plants in the Province and put them under the supervision of the Provincial Department of Health.

It is gratifying for our colleagues in Ontario to report that even in this short interval there appears to have been a very favorable effect on the number of cases of undulant fever, which in 1939 was reduced by 45 per cent, and in the number of cases of typhoid fever, which was lowered approximately 50 per cent, the infant mortality being also reduced substantially. It is gratifying also to report that, in spite of the natural objections which have been raised to a compulsory program, there has been little public support for those whose claims oppose pasteurization. The feasibility of applying pasteurization to both large and small municipalities, urban and rural, on a Provincial basis appears to have been plainly demonstrated.

---

## Association Seal

THE Editorial Board is indebted to Mellon Institute for permission to reproduce the Association seal as it appears on the cover of the *Journal* this month and as it will appear hereafter. This is a photograph of an aluminum medallion, one of thirteen such emblems of scientific societies which are lobby decorations in the Mellon Institute for Industrial Research in Pittsburgh. The medallion was copied from the Association seal, but improved in artistry and setting, and we are glad to acknowledge the debt to the Mellon Institute for this artistic service.

# Credit Lines

## A Selective Digest of Diversified Health Interests

D. B. ARMSTRONG, M.D., AND JOHN LENTZ, M.S.

### "THANK YOU" NOTE

Among the fears that beset the editors of this section before "Credit Lines" made its first appearance last September was the probability that there might be a scarcity of material. Consequently, an appeal was made to readers to send us booklets, posters, reports, and other health education material for review and comment. The response was not encouraging at first, but as the weeks went by all types of material began to flood our desk. And thus we found ourselves in a predicament. Almost without exception the material submitted was worthy of mention—there was almost no chaff among the grain. With so much at our disposal, it soon became evident that we could not hope to review all the excellent items that reached us. Therefore, to the readers who have sent in material that has not yet been reviewed—our apologies and our thanks. The co-operation that we have received from so many sources has made our editorial chair an easy one. It is hardly necessary to add that continued contributions will be welcomed and referred to in this section in so far as space permits.

### SOME NOTABLE HEALTH PUBLICATIONS OF 1940

Before the 1941 tide of health education media begins to sweep in, there are certain items produced during the past year that should be mentioned in these

columns. In the space available, we can do no more than list these materials and comment briefly upon them. We suggest that you check this list for items which you may not have seen.

1. The Food and National Defense Issue of *Consumer's Guide* (published September, 1940, by the Department of Agriculture, Washington, D. C. Available from the Superintendent of Documents, Washington, D. C., at 5 cents a copy). This impressive publication was designed to show how the life of our democracy and its continued preservation are inseparably linked with the science of nutrition. The theme of this issue—Making America Strong by Making Americans Stronger—is dramatized by superb photographs that in themselves tell a convincing story. The brief text is a rare combination of informative data coupled with certain passages that could easily pass for poetry—poetry reminiscent of some of Carl Sandburg's work. This publication is recommended to health educators for its effective photographs and text as well as for its general makeup.

2. *The Health Examination* (published by the Community Service Society, 105 East 22nd Street, New York, N. Y. Two issues available, one for men and one for women). These booklets make clear the value of the health examination by interpreting the various tests and procedures carried out by the physician and the nurse during

the course of a thorough physical examination. These publications were prepared primarily as teaching implements for public health nurses, but much of the material in each booklet could be used to advantage in campaigns designed to acquaint the public with the importance of annual health examinations. The booklets are especially noteworthy on two counts: (a) The full text of each is made up of quotations from noted medical and health authorities (a novel idea). (b) The photographs were especially posed to enable the reader to follow step by step the many procedures which the examinee undergoes. A word of criticism about these booklets—the pages are numbered in Roman numerals. In citing page references, etc., we find that the Roman system of numbering is always cumbersome and, to many people, confusing.

### 3. *Respirators—Locations and Owners*

*The Use of the Respirator in Poliomyelitis* by James L. Wilson, M.D. (Published and distributed by the National Foundation for Infantile Paralysis, Inc.; 120 Broadway, New York, N. Y. Furnished on request.)

The first of these booklets lists by state and city the owners of respirators throughout the United States. The information provided should be especially helpful to health authorities during epidemics of infantile paralysis. The second of these booklets was published to promote the proper use of the "iron lung" and other machines designed to provide respiration by mechanical means over prolonged periods of time. We suggest that copies of both be secured for every health department library.

4. The Group Talk Series (published monthly by the Public Relations Bureau of the Medical Society of the State of New York, 292 Madison Avenue, New York, N. Y.). These "talks" are issued for the lay person who may be invited to address club groups, civic

organizations, and other gatherings on health subjects. The "talks" are excellently written and contain much sound and fundamental information on a wide variety of health and medical topics.

### 5. *Your Health Center*

*Six Years of Progress in Public Health* (1934–1939)

(Published by the Department of Health of the City of New York.) The booklet entitled *Your Health Center* is an extremely attractive publication which was designed to create a better understanding of the health services offered by New York's district health centers. It possesses originality and freshness and conveys its message with an economy of words. Especially attractive features are the photographs, the typography, and such intriguing section titles as: Health for the Millions, The Advance Guard, Tomorrow's Grownups, Seeking Our Microscopic Enemies, etc. *Six Years of Progress in Public Health* relates the story of an unusually active and progressive period in the history of New York City's Department of Health. Within the space of 31 pages a cross-section of the manifold activities of our largest metropolitan health service is unfolded. This booklet should be reviewed by all health workers charged with the compilation of annual reports.

### GOING—GOING—ALMOST GONE!

Is diphtheria vanishing? Not everywhere, of course, and no doubt not completely for a long time. But the indications of a substantial trend in this direction are evidenced by the current experience of many communities. Notable among such manifestations is the record of the New York State population outside of New York City (incidentally, the City rate is almost as good). Among the population of Upstate New York (approximately six million), where the first intensive state-wide diphtheria control demon-

stration was initiated in 1926, there were, in 1925, 338 deaths from diphtheria, with a death rate of 6.4 per 100,000. In 1939, during the first 9 months of the year, there were 8 deaths, and the rate for the year was 0.016 per 100,000. During the first 9 months of 1940 there were only 3 deaths, which certainly indicates that the rate for the year 1940 will have to be figured in several decimals, out toward the vanishing point!

#### SMALLPOX DISPATCH

Dr. William P. Shepard of California calls our attention to some very interesting data with reference to smallpox incidence in the seven Pacific Coast and Mountain states (California, Colorado, Idaho, Montana, Oregon, Utah, and Washington). He points out that in these seven states in 1939 there were 1,530 cases of smallpox reported, with a case rate per 100,000 ranging from 3.1 in Utah to 29.1 in Colorado. The 1940 experience is in marked contrast, the first 9 months of the year showing a total of only 152 cases, with case rates ranging from 0 in Colorado to 2.3 in Oregon. It would appear that a high incidence of the disease stimulates education and promotes widespread vaccination, which in turn is followed by protection against the disease for a subsequent period. It is further reported that most of these cases, outside of California, occurred in lumber or mining camps in rural areas, where health education is difficult to carry out and from which the disease is brought to urban centers.

#### J.A.M.A. ARTICLES

Health educators who do not regularly read the *Journal of the American Medical Association* may have missed two important papers that recently appeared therein. If you failed to read "Health Information, Please," by Homer N. Calver (October 12, 1940,

issue of the *J.A.M.A.*), and a paper entitled "The Significance of the Tonsils in the Development of the Child," by Albert D. Kaiser, M.D. (October 5, 1940, issue of the *J.A.M.A.*), you will be rewarded by doing so. Mr. Calver's interesting article contains illuminating data on the much discussed and as yet little understood subject of health exhibits. Dr. Kaiser's exhaustive study discloses many points of interest concerning tonsils and tonsillectomies. One of the conclusions which he reaches is that "Tonsils are not as great a menace to a child as has been frequently suggested." This article should be of especial interest to school health authorities.

#### NOTED AND QUOTED

The following quotations were noted by the editors while reading various journals. So much wisdom—so much food for thought—is packed into these quotations that we felt it might be profitable to pass them on to our readers. If you have some favorite quotations of your own, send them along for publication. Please give the sources of any quotations contributed for use in "Credit Lines."

"A health problem (in a school child) challenges the physician and nurse for solution. A defect challenges no one but the statistician."

Dr. George M. Wheatley, New York City Department of Health, in a paper entitled "The School Physician in the Public Health Program." (*New York State Journal of Medicine*, October, 1940.)

"Pregnancy is good for syphilis, but syphilis is not good for pregnancy."

Joseph Earl Moore, M.D., Johns Hopkins University Medical School, in the publication *The Diagnosis of Syphilis by the General Practitioner*. U. S. Government Printing Office, 1938.

"Tuberculosis clinics are listening posts in the offensive campaign which will reduce the great white plague to guerilla status."

*Ohio Health News*

"In the battle of life with disease those who die are but a fraction of those who suffer wounds or are maimed."

Sir Arthur Newsholme

"It seems to me that a federal plan of compulsion in a country of so divergent characteristics as our own, is beyond human power to administer."

Dr. Kendall Emerson of the National Tuberculosis Association, in a paper en-

titled "Responsibility of Organized Medicine in Medical Care." (*American Journal of Public Health*, October, 1940.)

"The discovery of popular education as an instrument in preventive medicine, made by the pioneers in the tuberculosis movement, has proved almost as far-reaching in its results as the discovery of the germ theory of disease thirty years ago."

Professor C.-E. A. Winslow, Yale University

## BOOKS AND REPORTS

*Public Health Administration in the United States*—By *Wilson G. Smillie, M.D.* (2nd ed.) Macmillan, 1940. 553 pp. Price, \$3.75.

Dr. Smillie's book *Public Health Administration* met a need in this subject. His volume has become the standard text, both for study and for reference. It is seldom that a book on a subject which is so difficult and so diffuse immediately meets with such hearty approval of students of the subject. Now we have a second edition—enlarged, revised, improved, and brought up to date. The high standards are maintained. The text is readable and notable for its clarity and precision. If there is any comment that can be made, it would be that one would like to have a fuller discussion of many of the subjects. On the other hand, the author was necessarily limited in order to keep the work within the reasonable bounds of a textbook.

This second edition includes discussions of certain aspects of public health administration which have assumed importance during the past five years. Among these are the Social Security Act, the National Health Program, and the place of the health department in relation to hospital and sickness insurance.

The treatment of administrative features of communicable disease control has been revised to incorporate the recent developments in epidemiology. The section on tuberculosis and syphilis has been revised, while new sections have been added for such subjects as epidemic encephalitis, tularemia, and trichinosis. Nutritional deficiencies and their control are discussed in the light of present-day knowledge.

New photographs and line drawings add to the value of this new edition.

When the first edition appeared, public health was in the developmental stage in the United States. No one could have foreseen the rapid growth and expansion of public health administration that was about to occur. These developments have not been of a revolutionary nature, for the basic principles have remained unchanged, but the work has become more effective. Increased knowledge of the epidemiology of diseases has made it possible to carry out more precise measures. Smillie properly emphasizes our greatly increased knowledge concerning the importance of nutrition to individual and community welfare. It is increasingly clear that the extraordinary change that has occurred during the past few years has been the growth of public interest in national health and welfare. It also now becomes clear that the nation was ready for this expansion. The gains have been consolidated and it is a satisfaction to anticipate what may unfold in the immediate future. Smillie emphasizes the fact that the field of the health administrator is expanding; more and more responsibility is being placed on his shoulders. The pages we are reviewing are bound to be of assistance to students of all phases of public health, to medical students, to students of government, to social and welfare workers, public health nurses, sanitarians, and all those engaged in welfare activities.

The book is well made, the illustrations are well chosen, and it is destined to remain the outstanding volume on the subject.

M. J. ROSENAU

**The Public Health Nurse and Her Patient**—By *Ruth Gilbert*. *New York: Commonwealth Fund*, 1940. 396 pp. Price, \$2.25.

Here is an epochal book, marking a long step forward in the development of nursing—a book of incalculable value which implements our intuitive efforts to shape our service to the personal needs of the individual patient with the tool of understanding.

For a decade or two nurses have been reading the growing literature of psychology and psychiatry. Appreciation of the controlling rôle of emotions and their inseparability from organic reactions has grown. In one aspect after another of nursing, as, for example, in the care of the sick, of maternity patients, and in child health work, our recognition of the great significance of psychological phenomena has been growing sharper, accompanied by increasingly thoughtful examination of nursing purposes and procedures. This period of ferment, of groping, of growing insight, of critical evaluation, of trial of new methods, has at last crystallized to the point where a book can be written about the importance of the human equation in nursing and the meaning of attitudes and relationships in sickness and in health as they effect nursing practice.

This Miss Gilbert has done with brilliance. At last we have a book on the art of public health nursing—the art of helping persons to cope with both the physical and emotional strains associated with their illness, and to desire health enough to make the effort to have it. Miss Gilbert's interpretation of emotional stresses and of the ways in which nurses may meet them are based on sound psychological principles. She is a trained psychiatric social worker as well as a nurse. Certainly there is nothing dogmatic about her treatment of her subject. Nor is it any the less sound and penetrating because free

from obscure technical terminology. The content is readily apprehended, convincing, and usable because it is so completely pertinent, based as it is on situations which are thoroughly familiar to nurses—situations with which they are working daily.

This is a book that should be read and reread, and marked and pondered over and turned to again and again. No nurse, whatever her field of work, can afford to be without it, and we venture to suggest that health officers and their medical staff could learn much of value from its perusal.

It is a book which can be read with pleasure as well as with rich reward, so clear and delightful is Miss Gilbert's style. She has the rare gift of making an abstruse subject come alive in terms we can readily understand and put to use, and this without the distortion of oversimplification.

ELIZABETH G. FOX

**The Rockefeller Foundation, International Health Division, Annual Report, 1939.** *New York: The Rockefeller Foundation*, 1940. 230 pp.

This review of outstanding progress in the investigation of specific diseases, of aid given to state and local health services, and of the support of professional education is a scientific publication of unusual interest. Carefully prepared, and including appropriate illustrations and useful reading references to scientific articles of staff members, the report contains an enormous amount of valuable information regarding the status of virus studies and of measures for the control of yellow fever, certain respiratory diseases, tuberculosis, syphilis, rabies, hookworm, schistosomiasis, malaria, and mental diseases.

During 1939 assistance was given to public health work in 37 countries. Malaria work was carried on in India, Egypt, Portugal, Greece, Cyprus, Italy, Albania, British Guiana, Brazil, Sal-



vador, Panama, Costa Rica, Cuba, and Mexico. Increased attention was given to syphilis and rabies, while yellow fever, influenza, and scarlet fever were "subject to major attack." Large-scale measures for human immunization against yellow fever were conducted. A low temperature cabinet for the preservation of viruses which operates at a mean temperature of  $-76^{\circ}$  C. and new animal isolation quarters were developed and constructed. It is recommended that persons who expect to travel or reside in a region in which exposure to yellow fever is possible should be vaccinated against the disease.

An epidemiological method of study has been applied in the Eastern Health District of Baltimore to the problems of mental hygiene. Effort is directed toward: (1) determining the prevalence of mental disease, mental defects, and dysfunctions in an urban population; (2) discovering the economic, social, racial, and personal factors underlying these conditions; and (3) devising and putting into operation, as an integral part of the health services of the community, procedures designed to bring about effective management and prevention.

This volume contains a stimulating digest of reports of extensive laboratory, field, and administrative research, and of educational activities. One must read the report to appreciate the scope and significance of the services rendered.

IRA V. HISCOCK

*Mind Explorers*—By John K. Winkler and Walter Bromberg, M.D. New York: Reynal & Hitchcock, 1939. 378 pp. Price, \$3.00.

*Men Against Madness*—By Lowell S. Selling, M.D. New York: Greenberg, 1940. 342 pp. Price, \$3.50.

These books reflect a growing interest in the historical backgrounds of mental disease. As their titles indicate, both are based on the biographical method,

although they differ widely in content, interpretation, and quality.

*Mind Explorers* is the product of a collaborative effort between a psychiatrist, who has already written an excellent history of psychotherapy, and a popular biographer. It deals with outstanding experimenters during the past 150 years, from Franz Gall to Sigmund Freud. *Men Against Madness*, written by the director of the Psychopathic Clinic in the Detroit Recorder's Office, is somewhat more ambitious in historical scope, going back to the supposed treatment of mental disease among prehistoric cavemen 60,000 years ago. Winkler and Bromberg's book is concerned mainly with the contributions of psychologists to our knowledge of mental phenomena; Dr. Selling places major emphasis on the neurologists and physiologists.

In both books the selection and presentation of material follow highly arbitrary and sometimes confusing patterns. Advertised on its jacket as "the story of mental healing, told through the lives of its more significant practitioners," the bulk of *Mind Explorers* is actually devoted to psychological theorists and experimenters who never practised mental medicine. Furthermore, the book tends to over-stress the contributions of Americans to the neglect of certain eminent Europeans. The work of William James, G. Stanley Hall, James M. Cattell, and other American psychologists is described at length, while Europeans such as Wundt, Herbart, Fechner, Kretschmer, and Pearson are either mentioned briefly or not at all. Many pages are given to John B. Watson and behaviorism, while only passing mention is made of the more important Pavlov and reflexology. Notwithstanding such inconsistencies, however, *Mind Explorers* is on the whole a well written and informative book. The chapters on Gall, Mesner, William James, and G. Stanley Hall are particularly well done,

and should prove absorbing to the specialist and general reader alike.

Written in a popular style, Dr. Selling's *Men Against Madness* begins with a survey of treatment in ancient times, proceeds with biographical sketches of medieval and Renaissance contributors to the study of mental disorder, and concludes with chapters tracing the two main approaches to modern psychiatry: the organic and the functional. Much of the material in the book, particularly in the first half, deals with men, events and theories extremely remote from the general subject of mental disease, or "madness," as the author prefers to call it. The soundest and most interesting sections are those tracing the neurophysiological threads of the tapestry, through such figures as Gall, Bell, Bernard, Magendie and Hughlings Jackson. Other aspects of psychiatry, such as the contributions of the psychoanalytic school, are less happily handled. Dr. Selling's flair for sensational phrases leads him to regrettable characterizations of personalities, as well as to sweeping generalizations of dubious validity. The book is also marred by lengthy discursions, some questionable interpretations, and a frequent occurrence of minor but irritating errors of fact.

ALBERT DEUTSCH

**Medicolegal and Industrial Toxicology, Criminal Investigation, Occupational Diseases—By Henry J. Eilmann, Ph.D. Philadelphia: Blakiston, 1940. 324 pp. Price, \$3.00.**

This text is by the director of a physicians' laboratory service, Toledo, with prior experience in a dye and chemical company during the World War. Contents, in addition to a brief preface and a brief and very incomplete index: 1. Poisons and drugs (pp. 1-178); 2. Criminal investigations (pp. 179-206); 3. Medicolegal examinations of miscellaneous nature (207-282); 4. Industrial poisoning (283-299); 5. Occupational

diseases (301-322). The author refers to rendering expert testimony on numerous occasions as a bacteriologist, serologist, toxicologist, and haematologist. This has required painstaking search of scattered literature, much of which is here condensed without source citations. He has personally performed every test mentioned. Acknowledgment is made of the assistance of a prominent surgeon who specializes in ear, nose, and throat.

The subjects treated are fairly logically arranged, but with disproportional space to some—anthrax, glanders, tularemia, and Weil's disease as occupational diseases, and far too little to others—industrial poisons, in which methyl alcohol receives undue prominence, and the great class of aliphatic and aromatic poisons, almost nothing.

The discussions of atmospheric air, asphyxiations, food poisoning, and some of the commoner metallic poisons (arsenic, lead, mercury) are fairly complete but contain errors, according to accepted experience and standards. "Pneumoconiosis" overlooks the acute or rapid form. Only dermatitis is discussed under occupational chemical agents. The best features pertain to various tests, criminal investigations, and medicolegal examinations which, however, are too brief.

EMERY R. HAYHURST

**Graphic Presentation—By Willard C. Brinton. New York: Brinton Associates, 1939. 512 pp. Price, \$5.00.**

This book is a contribution from the engineering profession, but written for general use by those interested in graphic methods. The first part of the volume deals with How To Read a Chart, while later sections give suggestions for making a chart. An abundance of illustrations, selected from many sources, adds interest to the subject matter, as well as showing representative types of graphic charts. Useful

material is presented on the selection of paper, use of the camera, and use of color.

"Three things in combination are necessary before visual methods of presentation can be adequately used:

- "(1) Accurate factual data readily available
- "(2) Competent drafting talent to chart the data on a standardized basis
- "(3) Equipment and organization for reproducing the charted data at a cost not too high compared to the printed word."

IRA V. HISCOCK

**Sex in Marriage**—By Ernest R. Groves and Gladys Hoagland Groves. New York: Emerson, 1940. 250 pp. Price, \$2.00.

The Groveses have given us a readable streamlined book which they call "Sex in Marriage." It is sound, up-to-date, and reflects their wide experience and careful study of the subject throughout the years. Although the book is written for the newly married, those about to be married and those having marital difficulty because of sex maladjustment, nevertheless the text runs through the entire Freudian spectrum beginning at infancy, then childhood, through puberty, adolescence, courtship, marriage, the first night, and on the climacteric and the decline. The book aims to give "briefly and clearly information which an experience of twenty years in dealing with family problems has led the authors to think most useful in helping young people meet the sex demands in marriage." The authors are right in thinking that this should be useful in making young people meet the sex demands of marriage. As the title suggests, *Sex in Marriage* is concerned only with the common and normal problems of marriage. It is not a general treatment of sex; it puts no stress upon sex pathology, and has nothing of interest for those who turn to it to stimulate morbid curiosity. It is a straightforward

attempt to give sex information of value to those entering marriage, in the manner and the spirit of a book for beginners in gardening, housekeeping, or child nurture.

The influence of childhood upon adult or sex life is emphasized, but the authors keep to their chosen path, namely, the giving of practical help to those who are making sex adjustments of marriage. The subject is approached objectively, treated frankly, but never descends from its high level. Both sides of controversial subjects are considered. The book will serve a useful purpose to prevent difficulties, and even disaster, for those who contemplate marriage as well as those who are in the toils. It may unhesitatingly be recommended by doctors, social workers, the clergy, parents, and others before whom these problems constantly arise.

M. J. ROSENAU

**Children in a Democracy**—General Report Adopted by the White House Conference on Children in a Democracy, January 19, 1940. Washington: Superintendent of Documents, 1940. 86 pp. Price, \$.20.

This report of the fourth decennial White House Conference represents the group judgment of its 676 members, 27 of whom served 9 months on the report committee. There were no minority reports even though highly important subjects, often controversial in nature, are dealt with by representatives of different professions and interests affecting the welfare of children, including medicine, public health, education, social service, child guidance, religion, public administration, agriculture, and general civic interests.

This report is recommended as a brief, concise and exceptionally useful summarization of the most urgent present-day problems in the conservation of child health and welfare. The 98 recommendations made will serve as

an excellent guide toward the proper planning for the coming generations of children in our Democracy. Every health worker will do well to study this report carefully as an aid toward planning the local public health program.

ROY NORTON

**Manual of Industrial Health Hazards**—By *Joseph B. Ficklen*. West Hartford, Conn.: *Service to Industry*, 1940. 176 pp. Price, \$4.00.

According to the sub-title the work comprises, "Occurrence and uses, the properties, clinical symptomatology, permissible standards, physiological responses, and methods for the evaluation of over ninety noxious vapors, gases and dusts." It was compiled and copyrighted by the author who is chemical engineer of The Travelers Insurance Company. A chart shows potential health hazards occurring in 108 manufacturing classifications.

The book is the outgrowth of several years of active work in the field covered by the title, and aims to present methods in a concise and simple manner for the evaluation of industrial hygiene exposures to many dusts, vapors and gases. Acknowledgment is made for drawing upon such literature as the author has considered most appropriate.

Chapter I gives certain principles for making tests of air components and contaminants, and a description of simple sampling apparatus. The succeeding chapters are devoted to various chemicals or groups of materials arranged in alphabetical order (from "Acetaldehyde" to "Zinc"). The plentiful references occur as footnotes, while an Appendix contains useful measurement data, formulae, and instructions for standard reagents. There are 13 figures some in color.

This is a reliable guide by an experienced authority who has covered the essentials for many poisonous substances and, in a way, is an extension of a

plan undertaken by the Sub-committee on Chemical Procedures of the Committee on Standard Methods for the Examination of the Air, which reports in the *Year Book* (APHA), with inclusion of additional material. It has evidently required extensive and patient endeavor and, as characterizes good engineering expositions, is brief and to the point.

EMERY R. HAYHURST

**Principles of Psychiatric Nursing**—By *Madelene Elliott Ingram, R.N.* Philadelphia: *Saunders*, 1939. 428 pp. Price, \$2.75.

The teaching of psychiatry has been widely extended and improved in the medical schools in recent years, and psychiatric contributions to the general medical literature are increasingly in evidence. The leaven of psychiatric education has been similarly at work in the better nursing schools, where courses in this subject are forming a part of the regular curriculum with growing frequency, and of late we have seen a multiplication of psychiatric and mental hygiene texts for the special use of the nursing profession.

The book under review has been prepared for the undergraduate student interested in the nursing of the mentally ill. The fact that it has been written by a nursing instructor in one of the country's outstanding private mental hospitals, with a foreword by its medical superintendent, would alone vouch for its value were it not for the intrinsic merits of the book as a perusal will quickly show. It is essentially a "shop-talk" survey of mental nursing, covering every phase of nursing care of the mentally sick patient, from his admission to the hospital, through the various treatment procedures and the minutiae of supervision, to the requirements for his discharge. The needs of the individual patient are emphasized throughout.

The complications and problems and exigencies of mental nursing will come somewhat as a surprise to the uninitiated whose conceptions of the care of the mentally ill are still on the old custodial level. A well trained mental nurse must know all that the general nurse knows and infinitely more besides. In contrasting treatments of the physically ill with treatments of the mentally ill, the author makes some interesting observations on standardized procedures in general hospital nursing, adopted for the sake of efficiency, and the danger of their becoming "a wholly mechanized performance," devoid of personal feeling for the individual patient. "Treatments," she says, "tend to be formulated in procedures; procedures soon are accepted and taught as techniques. . . . Unfortunately, such robot efficiency insidiously comes to symbolize nursing in the minds of many young women. Should you be one who has developed the belief that technical perfection in procedures is the main factor in nursing, you immediately will be dismayed by the lack of 'things to do' when you have your first experience in caring for those who are mentally ill." She then goes on to enumerate the many "things to do" that confront the mental nurse who properly conceives her work and responsibilities. She soon learns in a well conducted mental hospital.

Unfortunately, there are still too many mental hospitals in which most of the patients receive little if any individual treatment, where they are cared for by untrained and underpaid attendants, and where the graduate nurse is an exception. Until the governing authorities make it economically possible for the state hospitals to employ more trained nurses, such instruction in competent nursing care of the mentally sick as taught in this excellent work remains, to a large extent, a counsel of perfection. Nevertheless, the good work of education in

mental nursing must continue, in the hope that a well prepared nursing profession in this most difficult of all fields of nursing will before long find our mental hospitals ready to engage it.

PAUL O. KOMORA

**Marriage**—By William Lyon Phelps. *New York: Dutton, 1940.* 56 pp. Price, \$1.00.

This book should be required reading for all devotees of that most searching test of mental hygiene, the art and practice of marriage. I would rather know that a psychiatrist accepts and lives in fact the sweet philosophy this scholarly Christian proposes, and himself observes, than to be assured he had been psychoanalyzed and completed his institutional residence.

HAVEN EMERSON

**Chemistry and Medicine: Papers Presented at the Fiftieth Anniversary of the Founding of the Medical School of the University of Minnesota**—Edited by Maurice B. Visscher. *Minneapolis: University of Minnesota Press, 1940.* 296 pp., ill. Price, \$4.50.

The volume is made up of a series of 14 lectures, each given by a specialist in his particular field. The contents are divided into 4 parts: Part I, Progress in the Application of Physical Chemistry to Medicine; Part II, Some Recent Investigations in Metabolism; Part III, Some Aspects of Immunity and Chemotherapy; Part IV, Some Approaches to the Nervous Control of the Organism. Many of the chapters will be of interest primarily to scientific investigators, others to those directly concerned with the application of chemical knowledge to medicine. Osmotic Work in Living Systems should be particularly interesting to those investigating the absorption of materials from the gastrointestinal tract. Concentration by the Kidney, is a concise resumé of the physiology of the kidney in health and

disease. Organic Chemistry and Vitamin Research is concerned more with the method of approach than the details of the recent organic chemistry of the vitamins. The lectures on Fats in the Diet, Heparin and Thrombosis, Action of Sulfanilamide and its Derivatives, and Chemistry in Urinary Antisepsis, will be of interest to physicians who seriously consider the scientific aspects of their profession.

The title of the book, "Chemistry and Medicine" seems rather unfortunate as this so often implies the application of chemical information to the practice of medicine, that many who purchase the book might assume that it was a comprehensive treatise rather than lectures on a few special subjects. If the scope of the book is realized, it becomes very useful to those whose particular interest may be along the lines indicated by the contents.

W. G. KARR

**The Public Welfare Administrator**  
—By *Elwood Street*. New York: McGraw-Hill, 1940. 422 pp. Price, \$4.00.

Based on years of experience by the author in public and private agencies, the material in this book deals with the things that the administrator "ought to know to do his job well, and it describes that job in terms of its responsibilities, opportunities, extent, and limitations." Following a brief discussion of the development of public welfare administration, problems of organization, personnel procedure, records, and local administration are among those considered in the 23 chapters, while an appendix gives suggestions for using the book as teaching material together with a helpful bibliography. Many illustrations of typical forms are given. Another valuable feature is a list of references for further reading and stimulating questions likely to face the administrator, given at the end of each chapter.

This is not only a useful manual or text for administrators of social work, staff members of organizations, teachers and students of social work, but it should be found a practical reference book for public health administrators in view of the interrelationships of health and welfare work.

IRA V. HISCOCK

**First Aid to Injured and Sick—**  
By *J. F. Sutherland*, revised and rewritten by *Holliday Sutherland* (42nd ed.). Philadelphia: Peter Reilly Co., 1940. 77 pp. (vest pocket size), 46 diagrams and manikin in colors. Price, \$.25.

A compact manual covering bones and skeleton, fractures, dislocations, blood circulation, hemorrhage, wounds, antiseptics, bandages and slings, digestion, nervous system, unconsciousness, shock and collapse, respiration, asphyxia, choking, drowning, artificial respiration, foreign bodies, burns and scalds, electricity accidents, poisons, air raid gases, and transport. Rather small print, well illustrated, and subject matter well organized. First published in 1887. Meant to be carried in the pocket or handbag.

EMERY R. HAYHURST

**Helping Adults to Learn: The Library in Action—***Edited by John Chancellor*. Chicago: American Library Association, 1939. 296 pp. Price, \$3.00.

This book deals specifically with library procedure and would therefore be of only general interest to public health education workers and publicity experts were it not for a section by William S. Learned, reprinted from an earlier work by him. This is the chapter "A Community Intelligence Service," which first appeared in 1924 in the book *American Public Library and the Diffusion of Knowledge*. The author describes a possible community

service of experts in various fields of knowledge who would make available to the public a great range of useful information which "lies smothered and useless so far as the great majority of the population are concerned." Hundreds of agencies, including health organizations turn out information "suited to the varying needs of various types of individuals, and in some cases bearing on the fundamental requirements of all individuals."

The idea is one which should appeal to health organizations which publish so much material useful to the general public and not always widely distributed. If any community has already started such a service the local organizations would do well to back it and if one has not been started it could be one of the efforts of the public relations department to inaugurate it.

ISABEL TOWNER

**Influence of a Public Health Program on a Rural Community—***By W. Frank Walker, Dr.P.H., and Carolina Randolph. New York: Commonwealth Fund, 1940. 106 pp. Price, \$.25.*

"A full-time public health program was started in 1924 to demonstrate to the people of the county that it is worth while to appropriate public funds for a comprehensive public health service." So, in the third review of the public health program of Rutherford County, Tenn., is stated the basic purpose of a coöperative enterprise established more than 15 years ago between the Commonwealth Fund and the Tennessee State Health Department. Financed in the demonstration years by liberal appropriations from the Fund, with relatively smaller appropriations from state and local agencies, the basic program has now been taken over in large part by government, with the Fund's contribution confined essentially to special and collateral services. In 1924 the total budget was \$30,799 of which

\$24,769 came through the Fund's support; whereas, in 1938 with a total budget of \$34,155 only \$3,630 was derived from the Fund, and this was for collateral services.

It is of interest that only 5 years were required to effect the take-over of principal services by the county government, for starting with a county appropriation of approximately \$3,500 in 1924, there was a steady increase in local funds until in 1929 the local government was appropriating \$27,600, and this is a county of but little more than 32,000 population.

Thus was the basic purpose of the coöperative enterprise realized. In essence the principle which the experience demonstrated was that the value of an adequate public health service could be proved within a maximum period of 5 years by the provision of such a service in the beginning. Incidentally, experience in the Province of Quebec, Canada, has since confirmed the principle in an entirely different social and economic setting. Rutherford was not the least difficult field which might have been selected for the trial. On the contrary, it is a fairly typical southern county with a per capita tax aggregate somewhat below that in many other sections of the country.

In the light of this demonstrated acceptance by the people themselves, the cold objective evidence afforded by analysis of service and vital statistics pale into relative insignificance, but such evidence there is, as the authors have well shown. Moreover, achievement of the basic purpose so fixes attention on a fundamental principle of public health administration that the lesser purposes and accomplishments may not receive the consideration to which they are in reality entitled.

No one local health service in Tennessee has made a larger contribution to the principles of public health practices, the training of personnel, and the

specificity of public health administration, than has that for Rutherford County. This reviewer knows from personal observation and experience how the area has been used as an experimental and proving ground and as a field training facility for public health workers.

Taken as a whole, this and the two preceding publications, the first by Dr. H. S. Mustard, director during the demonstration years, and the second by the present writers, constitute a series of reviews of great interest to students of modern public health administration as applied in local areas and as related to both federal and state administrative policy.

E. L. BISHOP

**Veterinary Bacteriology**—By I. A. Merchant, D.V.M. Ames, Ia.: Iowa State College Press, 1940. 628 pp. Price, \$7.00.

This textbook is designed as an introduction to bacteriology for students in veterinary medicine. Primarily it treats of organisms causing disease in animals, but considers also some strictly human pathogenic organisms, such as the germ of typhoid fever, since they have significance to veterinarians in the supervision of food products, such as milk, for example. It begins with a good discussion of the biology of microorganisms, including the morphology, physiology, methods of culture, and general laboratory technic. Classification and nomenclature are in accord with the fifth edition of *Bergey's Manual of Determinative Bacteriology*. Slightly more than a third of the book is given to these subjects, while approximately two-thirds is devoted to a description of characteristics of pathogenic bacteria and their effects on the lower animals especially. Sixty pages are devoted to viruses and virus diseases. There is a good index.

The book impresses us as being better than the average. The author has car-

ried out well the plan outlined in the Preface. There is sufficient history to hold the interest of the student. The application of our knowledge of infection and immunity is not lost sight of, and enough is given on toxins and anti-toxins, as well as the production of the various sera, to give beginning students a fair idea of methods.

The printing and make-up of the book are excellent, the illustrations good, and not too abundant. The information given is up to date and correct. It can be recommended without hesitation, bearing in mind the limitation set by the author in the Preface.

MAZÛCK P. RAVENEL

**An Anatomical Analysis of Sports**—By Gertrude Hawley. New York: Barnes, 1940. 191 pp. Price, \$3.00.

This text largely presupposes that the reader has a definite knowledge of muscular and skeletal anatomy. With this knowledge as a base, it discusses the kinesiology involved in the various acts and technics of sports—such as archery, basketball, equitation, fencing, swimming, tennis, etc.

This is valuable information. The actions and effects of the muscular movements involved in the different sports should be better understood, especially among those instructors in physical education, trained during the last 15 years or so, who have been inoculated with the idea that "play" is the whole of physical education. Some of these instructors are of little benefit to the health and physique building of their pupils.

Special teachers in physical education and teachers and coaches of sports might well study the content of this text.

CHARLES H. KEENE

**How to Work with People**—By Sumner Harwood. Cambridge, Mass.: Cambridge Analytical Services, 1940. 197 pp. Price, \$2.50.

Democracy at its crossroads requires



the coöperative endeavors of every one of its units. Manifestoes issued without the consent of the governed do not form a part of its program.

Sumner Harwood has given a very clear-cut picture of the incentives, costs, and gains of effective coöperation. Emphasizing the importance of mutual understanding, he tells without attempted over-simplification, of the specific factors comprising a coöperative agreement. The incentives for working together are balanced against the obligations and coercive forces. A section on the responsibilities of the executive in the coöperative group indicates a formula for his successful participation.

The apparent criticism is that the personal traits of executives and co-workers are widely variable within the limits of success. On the other hand, this summary of Harwood's researches carries the authority of the application of the scientific method to a field of endeavor which is difficult to reduce to exact terms. WILTON L. HALVERSON

*Administrative Cost Analysis for Nursing Service and Nursing Education—Report of Joint Committee of American Hospital Association and National League of Nursing Education. New York (1790 Broadway): National League of Nursing Education, 1940. 202 pp. Price, \$2.00.*

As is so aptly emphasized on the title page, this book, sponsored by the American Hospital Association and the National League of Nursing Education, in coöperation with the American Nursing Association, is essentially the result of a study to develop methods for finding out the costs of nursing service and nursing education.

Members of boards of trustees of hospitals, hospital administrators, superintendents of nursing, and nursing educators have given considerable thought in the past to this subject. Nursing service and the conduction of nursing

education within the environment of the same hospital is, of course, the common practice. In the furtherance of nursing education, student nurses must participate in bedside nursing care. Frequently to be expected criticism of the service rendered by the student nurse has raised the question as to the comparative costs and the advantages of graduate versus student nursing service. The question has also been raised as to the relative cost of the nursing service rendered by the hospital and the nursing education it carries on. The experience in the past has been the difficulty in arriving at these true costs. The utilization of the accounting methods outlined in this book will go far in answering these questions.

Fourteen representative hospitals were carefully selected as the background for this study, and a chapter is devoted to a comparative analysis in three of these hospitals, one in the East, one in the West, and one classified as a special hospital.

Adequate space is devoted to accounting problems encountered in attempting to determine true nursing costs, as well as the costs of carrying on nursing education.

Costs incurred in teaching students are presented, as well as the value of the service rendered by the student nurse. The variables in the policies of these three hospitals as factors in the determination of costs are listed. Among these are the size of the school, size of the hospital, remuneration received, vacations, fees paid by students, etc. All of this leads to the conclusion that costs of nursing service and nursing education are influenced by many varying factors.

Tables, exhibits, forms, and diagrams deal with the methods to be used in arriving at a true understanding of nursing costs, as well as those incurred in the conduction of nursing education.

This book is particularly recom-

mended as one which should be of interest and value to hospital superintendents, nursing administrators, directors of training schools for nurses,

trustees of hospitals, and others interested in the costs of nursing care and in the education of the pupil nurse.

CHARLES F. WILINSKY

## BOOKS RECEIVED

- LEGAL GUIDE FOR AMERICAN HOSPITALS. By Emanuel Hayt and Lillian R. Hayt. New York: Hospital Textbook Co., 1940. 608 pp. Price, \$5.00.
- THE AMERICAN AND HIS FOOD. By Richard Osborn Cummings. Chicago: University of Chicago Press, 1940. 267 pp. Price, \$2.50.
- L. EMMETT HOLT: PIONEER OF A CHILDREN'S CENTURY. By R. L. Duffus and L. Emmett Holt, Jr. New York: Appleton-Century, 1940. 295 pp. Price, \$3.00.
- HEALTHFUL LIVING SERIES. Bulletin No. 1. Healthful Living Through the School Day and in Home and Community. By Nina B. Lamkin. Rev. Ed. Santa Fe: New Mexico State Department of Public Health, 1940. 103 pp. Price, \$.25.
- POPULATION TRENDS AND PROGRAMS OF SOCIAL WELFARE. New York: Reprinted from Milbank Memorial Fund Quarterly, 1940. 99 pp. Price, \$.25.
- LABORATORY MANUAL FOR PHYSICIANS: AIDS IN DIAGNOSIS AND TREATMENT. Issued by Division of Laboratories and Research, New York State Department of Health, Albany, N. Y. 1940. 103 pp.
- PSYCHIATRIC SOCIAL WORK. By Lois Meredith French. New York: Commonwealth Fund, 1940. 344 pp. Price, \$2.25.
- THE VIRUS: LIFE'S ENEMY. By Kenneth M. Smith. New York: Macmillan, 1940. 176 pp. Price, \$2.00.
- COÖPERATION IN THE ADMINISTRATION OF TAX-SUPPORTED MEDICAL CARE. August, 1940. Chicago, Ill.: Committee on Medical Care, American Public Welfare Association. 32 pp. Price, \$.20.
- HUGH YOUNG: A SURGEON'S AUTOBIOGRAPHY. New York: Harcourt, Brace, 1940. 554 pp. Price, \$5.00.
- A SURGEON EXPLAINS TO THE LAYMAN. By M. Benmôsché. New York: Simon & Schuster, 1940. 317 pp. Price, \$3.00.
- FROM INFANCY TO ADOLESCENCE: AN INTRODUCTION TO CHILD PSYCHOLOGY. By F. K. and R. V. Merry. New York: Harper, 1940. 330 pp. Price, \$2.00.
- FOOD VALUES OF PORTIONS COMMONLY USED. By Anna dePlanter Bowes. 3d Ed. Rev. Philadelphia: Author, 1940. 31 pp. Price, \$1.00.
- YOUTH LOOKS AT CANCER: A TEXT PREPARED FOR COLLEGES, PREPARATORY SCHOOLS, AND HIGH SCHOOLS. Bronxville, N. Y.: The Westchester Cancer Committee, 1940. 55 pp.
- THE DOCTOR AND THE DIFFICULT CHILD. By William Moodie. New York: Commonwealth Fund, 1940. 214 pp. Price, \$1.50.
- CARNEGIE CORPORATION OF NEW YORK. Report of the President and of the Treasurer, 1940. 183 pp.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

**Good News**—The National Institute of Health is organizing a new unit for research into some of the many problems of aging.

ANON. Unit on Gerontology in the National Institute of Health. *Pub. Health Rep.* 55, 46:2099 (Nov. 15), 1940.

**Gathering in Air Raid Casualties**—Procedures through which victims of air raids are given prompt medical care are described by a half dozen British medical officers of health. God grant that these gruesome details will never have more than academic interest for our sanitarians.

ANON. Experience Gained in Regard to Air Raid Casualties and Hospital Services. *Pub. Health.* 54, 1:5 (Oct.), 1940.

**Toxoid Immunization for Adults**—For the immunization of non-immune medical students, nurses, and other adults, a method is proposed by which those who are sensitive to toxoid may still be treated by that agent rather than by the use of toxin-antitoxin.

BUNCH, C. P., *et al.* Studies on the Immunization of Adults with Diphtheritic Toxoid. *J. Immunol.* 39, 5:27 (Nov.), 1940.

**Doctors' Visits**—A wealth of unusual information about how often, and for what causes, the doctor is called by sick people now is opened to you. For instance, you will learn that women, even when their genital and puerperal troubles are excluded, get 15 per cent more medical attention than do men. But when it comes to care by non-medical practitioners—osteopaths, chiropractors, *et al.*—the ladies charitably known as "over 21" are in their element, for they enjoy an excess

of 82 per cent non-medical medical care over the same type of treatment given to men of equally tender years. Another curious phenomenon, though mothers are strong for non-medical medical care, children receive precious little of it.

COLLINS, S. D. Frequency and Volume of Doctors' Calls among Males and Females in 9,000 Families, Based on Nation-wide Periodic Canvasses, 1928-1931. *Pub. Health Rep.* 55, 44:1977 (Nov. 1), 1940.

**The Ill-Housed Third**—It is suggested that the public health nurse has a unique opportunity to discover insani-tary and substandard housing conditions and to stimulate their correction by the appropriate social agency. It would seem a large order.

DUNN, M. J. The Housing Problem as It Affects Public Health Nursing Activities. *Pub. Health Rep.* 55, 42:1879 (Oct. 18), 1940.

**Sex and Sickness**—Disability rates for female employees are consistently higher than for males. If females suffered only from non-respiratory diseases their sickness rates would equal the rates covering all sickness and non-industrial injuries among males.

GAFNER, W. M., and FRASIER, E. S. Studies on the Duration of Disabling Sickness. *Pub. Health Rep.* 55, 42:1892 (Oct. 18), 1940.

**"No Justification for Complacency"**—So begins this brief but comprehensive discussion of the cause, control, prevention, and care of scarlet fever. The paper, written for nurses, is commended to all.

GORDON, J. E. Public Health Practice in Scarlet Fever. *Pub. Health Nurs.* 32, 11:651 (Nov.), 1940.

**Queer Doings**—You can scarcely fail to be intrigued by the unaccountable shenanigans of the rickettsia of "Q" fever, which sneaked mysteriously about the corridors of a building of the National Institute of Health, unaccountably striking first this then that employee with a pneumonitis. Of course, the story is related in cold, matter-of-fact detail, but your imagination will readily weave it into a regular who-dun-it thriller.

HORNIBROOK, J. W., *et al.* An Institutional Outbreak of Pneumonitis. *Pub. Health Rep.* 55, 43:1936 (Oct. 25), 1940.

**If War Come**—Because cities have become the front line of battle, the civilian public health service can no longer be separated from military medical service. Psychiatry, nutrition, and epidemiology are now equally the province of wartime preventive medicine. Useful discussion of the last of these fields is included in this article.

JANEWAY, C. A. Wartime Preventive Medicine. *New Eng. J. Med.*, 223, 21:854 (Nov. 21), 1940.

**The Lead We Eat**—It seems that one may consume 1 or 2 mg. of lead per day and still excrete so much of it that no poisoning will result. The lead one gets in ordinary foods and beverages will average about 0.3 mg. per day, so don't become too disturbed about the danger of lead poisoning from your food. This is worth remembering the next time a rumpus is raised about sprayed fruit.

KEHOL, R. A., *et al.* Experimental Studies on the Ingestion of Lead Compounds. *J. Indust. Hyg. & Toxicol.* 22, 9:381 (Nov.), 1940.

**Saving Baby Teeth**—A useful table showing the approximate ages at which the various deciduous teeth may be expected to be lost introduces this excellent discussion of oral hygiene for youngsters.

MORREY, L. W. Dental Care for the Pre-school Child. *Pub. Health Nurs.* 32, 11:671 (Nov.), 1940.

**More about Tuberculosis**—Since the World War, the government has paid a billion dollars in compensation to tuberculous veterans. Two and a third army divisions have occupied hospital beds because of tuberculosis. It's about time we began to consider preventive measures pretty seriously which the papers in this symposium proceed to do ably.

MYERS, J. A., *et al.* Epidemiology of Tuberculosis (and two related papers). *J.A.M.A.* 115, 19:1609 (Nov. 9), 1940.

**TB among Husbands and Wives**—More women whose husbands had tuberculosis died of the disease than did a comparable group of women in the same locality. Deaths of husbands of tuberculous wives did not show the same significant increases from the disease. One negative x-ray picture taken a few months after the discovery of the initial case is not proof of freedom of infection.

PATERSON, J. F. Tuberculosis in Married Couples. *Am. J. Hyg.* 32, 3:67 (Nov.), 1940.

**Control of GC**—In studying the efficacy of sulfanilamide in the treatment of gonorrhea, it was found that more than half the patients lapsed treatment before observations could be completed. This may be one reason why gonorrhea is such a widespread disease. The distinguished committee urges better control of clinic patient attendance.

PELOUZE, R. S., *et al.* Gonorrhea in the Male. *J.A.M.A.* 115, 19:1630 (Nov. 9), 1940.

**Hazards of the Open Road**—If you wish to avoid accidents on country highways drive on any foggy Thursday during February or March between 5 and 8 in the morning. Choose

a crooked road, covered with snow, and you will have the best chance of reaching your destination alive and uninjured. These are some entertaining conclusions reached in a perhaps too brief perusal of an excellent article on highway safety.

POWERS, J. H. Automobile Accidents in a Rural Area Traversed by a Trans-Continental Highway. J.A.M.A. 115, 18:1521 (Nov. 2), 1940.

**A Public Health Step-child—**Rheumatic fever is responsible for four times the deaths that result from diphtheria, scarlet fever, measles, whooping cough, meningitis, and poliomyelitis combined. The reasons why the disease should be attacked through a comprehensive and adequate public health program are ably presented.

SWIFT, H. F. Public Health Aspects of Rheumatic Heart Disease. J.A.M.A. 115, 18:1509 (Nov. 2), 1940.

**Skin vs. Hidden Cancer—**If you are that *rara avis*, a fairly regular reader of this bibliography, you may

remember earlier references to papers suggesting the protective value of skin cancers against more deadly internal forms. Well, here is an answer. "Cancer of the skin does not protect against the development of cancer elsewhere." People with skin cancer have definitely more cancer of organs other than the skin than are found in a similar population exhibiting no skin lesions.

WARREN, S., and GATES, O. Cancer of the Skin in Relation to Multiple Malignant Growths. J.A.M.A. 115, 20:1705 (Nov. 16), 1940.

**Prostitution and Preparedness—**Successful Canadian efforts to suppress commercialized prostitution as one venereal disease control method remind us of the ever-present problem here which is made the more pointed by our national preparedness projects. Are American local health departments as active in this field as is Vancouver?

WILLIAMS, D. H. Commercialized Prostitution and Venereal Disease Control. Canad. Pub. Health J. 31, 10:461 (Oct.), 1940.

## ASSOCIATION NEWS

### APPLICANTS FOR MEMBERSHIP

*The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.*

#### *Health Officers Section*

Harold N. Brodersen, M.D., M.P.H., 670 S. Ferris Ave., Los Angeles, Calif., Communicable Disease Physician, Los Angeles County Health Dept.

Gerald F. Burgardt, M.D., Room 613, City Hall, Milwaukee, Wis., Deputy Commissioner of Health

M. L. Fuller, M.D., P. O. Box 1066, Amarillo, Tex., City Health Officer

Harry H. Hudson, M.D., Health Dept., Cleveland, Tenn., Director, Bradley County Health Dept.

Michel Jean-Marie LaSalle, M.D., Government Hospital, Port Saunders, Newfoundland, Medical Health Officer

Charles R. Reynolds, M.D., 412 S. Office Bldg., State Dept. of Health, Harrisburg, Pa., Director, Bureau of Tuberculosis Control

Myron P. Rudolph, M.D., Dr.P.H., Fort Knox, Ky., Surgeon, 5th Division, U. S. Army

Fannie I. Tomson, M.D., M.S.P.H., 82-68 164th St., Jamaica, L. I., N. Y., Health Officer-in-Training, New York City Health Dept.

#### *Laboratory Section*

Helen M. Ash, 1913 Henry St., Berkeley, Calif., Student, Univ. of California

Ella M. Collier, A.B., 2317 McGee Ave., Berkeley, Calif., Graduate Student, Univ. of California

John Lazarov, 5346 Chippewa St., St. Louis, Mo., Bacteriologist, City Health Dept.

Harold C. Olson, Ph.D., Dept. of Dairying, Oklahoma A. & M. College, Stillwater, Okla., Professor of Dairy Manufacturing

Shrish Chandra Seal, M.B., 110 Chattaranjan Ave., Calcutta, India, Fellow, International Health Division, Rockefeller Foundation

David J. Sobin, M.D., 16128 Fairfield Ave., Detroit, Mich., Physician

Lyon P. Strean, D.D.S., 645 Wellington St.,

Montreal, Que., Canada, Bacteriologist, Research Laboratory, Ayerst, McKenna & Harrison, Ltd.

John P. Torrano, A.B., 4016 Penniman Ave., Oakland, Calif., Student, Univ. of California

#### *Vital Statistics Section*

Laura Lee, 758 S. Amalia Ave., Los Angeles, Calif., Deputy Registrar, Grade II, Los Angeles County Health Dept.

Sigismund Peller, M.D., 477 First Ave., New York, N. Y., Graduate School, New York Univ.

#### *Engineering Section*

Eric P. Bollman, B.S., 1015 E. Helen St., Tucson, Ariz., Sanitarian, Tucson-Pima County Health Dept.

Cyrus W. Emery, 1207 2nd Ave., Laurel, Miss., Sanitary Engineer

Anthony J. Kranaskas, State Dept. of Public Health, Atlanta, Ga., Assistant Public Health Engineer

James P. Slater, B.S., Farm Security Administration, Milwaukee, Wis., Assistant Sanitary Engineer, U. S. Dept. of Agriculture

#### *Industrial Hygiene Section*

Lemuel C. McGee, M.D., Hercules Powder Co., Wilmington, Del., Medical Director

Ludwig Teleky, M.D., 2444 E. 74th Place, Chicago, Ill., Technical Adviser, Div. of Industrial Hygiene, State Dept. of Public Health

Clarence L. Weirich, M.S., C. B. Dolge Co., Westport, Conn., Laboratory Staff

#### *Food and Nutrition Section*

C. Olin Ball, Ph.D., American Can Co., 230 Park Ave., New York, N. Y., Assistant to Director of Research

A. Stanley Cook, Ph.D., 645 Wellington St.,

Montreal, Que., Canada, Director, Research and Biological Laboratories, Ayerst, McKenna and Harrison, Ltd.  
 Richard N. Roerig, M.S., 1005 S. 6th St., Champaign, Ill., Graduate Student, Univ. of Illinois

#### *Maternal and Child Health Section*

Mary M. Atchison, M.D., M.P.H., 9 Green St., Concord, N. H., Director, Maternal and Child Health, State Board of Health  
 J. Bay Jacobs, M.D., District of Columbia Health Dept., Washington, D. C., Director of Maternal Welfare

#### *Public Health Education Section*

Alice Evans, M.A., 660 Frederick St., Detroit, Mich., Director of Health Education, Children's Fund of Michigan  
 Joseph Franklin, A.B., 1171 Boylston St., Boston, Mass., Graduate Student, Massachusetts Institute of Technology  
 Jennie Freese, R.N., 214 E. Hancock St., Detroit, Mich., Head Nurse, Food Handlers' Division, Dept. of Health  
 Charles G. Kahlert, M.S., 1256 West 51st St., Los Angeles, Calif., Chief, Division of Public Health Education, Los Angeles County Health Dept.  
 Alice V. Keliher, Ph.D., 20 E. 11th St., New York, N. Y., Teacher, New York Univ.  
 Sister Mary Immaculata Lamey, R.N., Ph.B., Provincial House, Sisters of Mercy, 326 Ingalls St., Ann Arbor, Mich., Graduate Student, Univ. of Michigan  
 Ruth A. Page, A.B., 9 E. Lake Front, Rochester, N. Y., Graduate Student, Univ. of Michigan  
 Josephine L. Rathbone, Ph.D., Teachers College, Columbia Univ., New York, N. Y., Assistant Professor of Physical Education  
 Arthur R. Turner, M.D., 5744 Drexel Ave., Chicago, Ill., School Physician, Univ. of Chicago  
 Beatrice H. White, M.A., Brooklyn College, Bedford Ave. & Ave. H, Brooklyn, N. Y., Teacher of Hygiene

#### *Public Health Nursing Section*

Thelma R. Anderson, R.N., B.S., State Dept. of Public Health, Nashville, Tenn., Nurse Consultant  
 Rose Eilmann, R.N., State Dept. of Public Health, Nashville, Tenn., Nurse Consultant

Ethel E. Osborne, R.N., 1828 E. 81st St., Cleveland, Ohio, Supervisor, School Nurses, Cleveland Board of Education  
 L. Elise Smith, 720 Fortification, Jackson, Miss., Supervisor, Crippled Children's Nursing Service  
 Bessie F. Swan, R.N., M.S.P.H., School of Education, Indiana Univ., Bloomington, Ind., Instructor and Supervisor, Public Health Nursing  
 Elizabeth Wyss, R.N., Room 35, Court House, Fort Dodge, Iowa, Supervising Nurse, District Health Service 4, State Dept. of Health

#### *Unaffiliated*

Ruth E. Church, M.D., 50 Haven Ave., New York, N. Y., Student, DeLamar Institute of Public Health  
 Kerwin W. Kinard, M.D., Hotel Belgravia, Chestnut St., Philadelphia, Pa., Student, Univ. of Pennsylvania  
 Samuel J. Miller, Ch.E., DuBois Co., Cincinnati, Ohio, Chemical Director  
 Amos G. Stiker, D.D.S., Addison, N. Y.

#### DECEASED MEMBERS

Ralph K. Collins, M.D., New York, N. Y., Elected Member 1935  
 Mrs. Florence W. Englesby, R.N., Pierre, S. D., Elected Member 1935, Elected Fellow 1938  
 Raymond Pearl, Ph.D., Baltimore, Md., Elected Member 1917  
 Elizabeth Stringer, Brooklyn, N. Y., Elected Member 1919, Fellow 1925

#### NEW FELLOWSHIP APPLICATION BLANK

WITH the recent adoption of new By-laws covering the qualification and election of Fellows, a revision of the Fellowship application blank has been prepared.

The new forms are now available in the Administrative Office, and it is suggested that members destroy any of the old forms that may be in their possession. Applications for Fellowship may be filed at any time before the closing date, August 1, in order to be considered at the 70th Annual Meeting in Atlantic City, October 14-17, 1941.

## EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

### POSITIONS WANTED

#### ADMINISTRATIVE

Administrative public health or epidemiological position is desired by well qualified physician, with M.P.H. degree, 16 years' experience as county and city health officer, and 3 years' epidemiologist. **A206**

Experienced physician; graduate University of Illinois; M.P.H., Johns Hopkins, 1940; seeks administrative opening suitable to his proven ability. Excellent references. **A466**

Physician; M.P.H., Harvard; well experienced in city and rural health administration; will consider appointment as district health officer or in city or state health department. **A418**

Physician; M.D., Yale; M.S.P.H., Columbia; also short course for health officers, Vanderbilt; good clinical background; 3 years' public health experience; will consider appointment in child health, epidemiology or public health administration. **A350**

Physician; aged 39, excellent graduate training and experience in public health, specialized in tuberculosis and epidemiology, now employed, will consider position with salary of \$4,500 or better. **A473**

Physician, aged 38; M.P.H., Harvard, 1932; experienced as director of county units and in state department of health; will consider administrative position. **A474**

Physician; graduate Columbia, 1919; Dr.P.H., Yale, 1938; specializing in child hygiene; experienced with community surveys; will consider administrative position or opportunity in child hygiene. **A475**

Physician; M.D., University of Cincinnati; with postgraduate training in venereal disease control; Johns Hopkins; is available as venereal disease control officer. **A363**

Physician, 32; M.D., 1936; postgraduate course in venereal disease control, experienced as district health officer and in organizing and publicizing syphilis control campaign; now employed in charge venereal disease clinics in metropolitan health department; seeks venereal disease control post with opportunity to organize or administer program. **A437**

Physician; with C.P.H., Johns Hopkins, and some field experience with large state health department, wishes position in epidemiology or administration. **A443**

#### HEALTH EDUCATION

Young woman; Ph.D., Columbia University; splendid background of experience in health education; will consider position as director of public health education. **H294**

Well qualified woman physician, M.A. and M.D. from Stanford; with 6 years' experience in nationally known secondary school in health education and medical advisory duties; wishes position in college health work. **H448**

Public health nurse; M.A., Columbia, experienced in teaching health education and public health nursing; wishes teaching position in college or university, summer of 1941. **H472**

#### LABORATORY

Teaching, executive or administrative position desired by experienced teacher in bacteriology and public health; Ph.D., Cornell; now professor in grade A medical school. **L327**

Experienced woman bacteriologist; Ph.D., University of Illinois, 1937; wishes position in teaching or research. Excellent bibliography and references. **L410**

Experienced bacteriologist; young man of 33, Sc.B., who for several years has been in charge of state laboratory doing public health and diagnostic bacteriology, immunology and serology, will consider opening. **L427**

#### SANITARY ENGINEERING

Engineer, aged 38; 3 years' experience as district sanitarian supervisor, state department of health, together with work on plumbing, heating and ventilation; will consider position in the plumbing and heating field or state department of health. Prefers middle western or western states. **E453**

Public health engineering position desired by man with M.S. in Sanitary Engineering from Harvard, and 7 years experience, including 4 years with state department as assistant engineer. **E468**



## Advertisement

## Opportunities Available

**INDUSTRIAL HYGIENIST**—State department of health; must be exceptionally qualified; South. PH1-1, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**COUNTY HEALTH PHYSICIANS**—(a) Several for central state; \$4,000-\$4,200, plus travel allowance. (b) Several for southern state; training available to physicians interested but not trained in public health. (c) County health physician for desirable Montana location; estimated annual income \$5,000; private practice privileges; beautiful, healthful country; fine type of people. No. PH1-2, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**CITY HEALTH PHYSICIAN**—(a) Large central metropolis; duties include investigating communicable disease cases and contacts, immunizing children against diphtheria and smallpox, physical examinations of school children and holding well-baby clinics for infants and children of pre-school age; \$2,700, increasing; city will furnish gasoline for car. (b) Virgin Islands; married physician with general practice experience required; \$2,400. No. PH1-3, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**STUDENT HEALTH PHYSICIANS**—(a) Immediately for fairly large western school; about \$3,000. (b) September 1941; four-year appointment with university health service combining training in public health or other specialty, leading to Master's degree, with departmental duties. No. PH1-4, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**INSTRUCTOR IN PUBLIC HEALTH NURSING**—Graduate nurse with M.S. or B.S. degree, certified in public health nursing, to serve as major instructor in public health nursing to graduate nurses taking degree and certificate courses in this specialty; salary commensurate with experience. No. PH1-5, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**CHILD HEALTH CONSULTANT**—State department of health; certified public health nurse with B.S. degree and special preparation in maternity, plus supervising experience; \$200, travel expenses. No. PH1-6, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSING SUPERVISORS**—(a) County health department; actual experience as public health nurse and supervisor required; \$175, plus travel budget. (b) County health department; degree and supervising experience in health department required; staff of eight; \$1,700. PH1-7, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**EMERGENCY DEPARTMENT SUPERVISOR**—Eastern hospital of 500 beds; degree and experience in managing an emergency department desirable; excellent opening. No. PH1-8, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSE**—For interesting appointment in rural nursing program of western state. No. PH1-9, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSE**—Must be qualified to teach a generalized program to students; \$150, plus car maintenance; vicinity Chicago. No. PH1-10, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSES**—Several certified public health nurses for city health department; community of over a hundred thousand population; \$125-\$150. No. PH1-11, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**SCHOOL NURSE**—To serve under direction county health department; immediately; Florida. No. PH1-12, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**BACTERIOLOGIST**—City health department; work includes milk and water bacteriology, some chemical tests on milk, preparation of necessary media, stains and reagents, diagnostic bacteriology of smears, throat cultures, sputum, Widal reaction, darkfield preparations, some food analysis with identification of organisms found therein and examination of spinal fluid; no serology necessary; around \$150; midwest. No. PH1-13, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

## Situations Wanted

**PUBLIC HEALTH PHYSICIAN**—Certified public health physician is available; bachelor's and medical degrees from southern university; C.P.H., Johns Hopkins; four years, director student health service, state university; five years, executive position with state health department. No. PH1-16, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH PHYSICIAN**—Young physician would like public health appointment enabling him to use his special training in obstetrics; following rotating internship had four years' training in obstetrics and gynecology; in private practice since September; prefers full-time public health appointment in maternity work. No. PH1-17, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**BACTERIOLOGIST**—A.B., Ph.D., state university; six years, university laboratory of animal pathology; four years, parasitologist, state department public health. No. PH1-15, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSE**—Graduate of an eastern training school; B.S. degree in Public Health Nursing, Columbia; ten years, director of nurses, public health nursing association; five years, field supervisor, large industrial company; three years, educational director and supervisor, Visiting Nurse Association; previous executive appointment in public health nursing. No. PH1-14, Medical Bureau (M. Burneice Larson, Director), Palmolive Building, Chicago.

## NEWS FROM THE FIELD

### FIRST MUSEUM OF HEALTH IN THE UNITED STATES OPENS

ON November 12, the Cleveland Health Museum, the first of its kind organized in the United States, was formally opened with a distinguished group of Cleveland citizens and out-of-town guests in attendance. Dr. Benjamin G. Horning, Assistant Field Director of the Association, brought congratulations in the name of the American Public Health Association and presented a certificate of Fellowship to Dr. Bruno Gebhard, the Director of the Museum.

Among other organizations which were officially represented at the opening were the American Dental Association, the American Medical Association, the Ohio State Health Department, American Museum of Health, United States Public Health Service, Cleveland Academy of Medicine, Cleveland Dental Society, and Cleveland Public Health Department.

The purposes of the Cleveland Museum of Health are stated to be:

To spread definite knowledge of unquestioned accuracy.

Lead more people to a better understanding of the progress in medical science.

Sharpen consciences with respect to public health.

Be a center for health education technics.

Be a center of research on problems of personal health and hygiene.

Emphasize mental, as well as physical hygiene, showing how we can better live together in our family and community life.

One hundred and thirty-three exhibits were on display at the opening, the majority constructed in the Museum's own shop. Many dealt with general and specific anatomical subjects, and others bore such titles as "Fitness for Defense," "Safe Maternity," "Progress in Medicine," and "Posture." A limited edition of souvenir booklets of

the opening include descriptive titles of the 133 exhibits, and while the supply lasts, copies may be obtained from the Museum.

### CANADIAN PUBLIC HEALTH ASSOCIATION OFFICERS, 1941

THE following officers of the Canadian Public Health Association for 1941 were elected at their 29th Annual Meeting, held in Winnipeg, Manitoba, September 19-21, 1940:

*Honorary President*—The Hon. Henri Groulx, Minister of Health and Provincial Secretary, Province of Quebec.

*President*—Dr. Jean Gregoire, Deputy Minister, Ministry of Health, Province of Quebec.

*Vice-Presidents*—Dr. Grant Fleming, Montreal; Dr. J. J. McCann, Renfrew; Dr. B. T. McGhie, Toronto; Dr. Arthur Wilson, Saskatoon.

*Honorary Secretary*—Dr. J. T. Phair, Toronto.

*Honorary Treasurer*—Dr. A. L. McKay, Toronto.

*Chairman of the Editorial Board*—Dr. R. D. Defries, Toronto.

*Executive Committee*—Dr. Gordon Bates, Toronto; Dr. H. C. Cruikshank, Toronto; Dr. D. V. Currey, St. Catharines, Ont.; Dr. R. O. Davison, Regina; Dr. R. D. Defries, Toronto; Dr. Grant Fleming, Montreal; Dr. D. T. Fraser, Toronto; Dr. Jean Gregoire, Quebec; Dr. A. L. McKay, Toronto; Dr. J. T. Phair, Toronto; Dr. G. D. Porter, Toronto; Dr. R. E. Wodehouse, Ottawa.

### INCREASE OF COMMUNITY CHEST FUNDS

COMMUNITY Chests and Councils, Inc., New York, N. Y., announced on November 1 that 75 Community Chests have raised \$13,686,000 for 1941, an increase of 2.9 per cent over the total raised by the same Chests for 1940. Two-thirds of the Chests were over the top, some by more than a 5 per cent margin, and the average for the 75 as a whole is 99.4 per cent of the goal.

PUBLIC HEALTH NURSING CURRICULUM  
STUDY — ITS PURPOSE, SCOPE  
AND PROGRESS

A PUBLIC health nursing curriculum study was launched in February, 1940, as a joint enterprise of the National Organization for Public Health Nursing and the U. S. Public Health Service. There are at the present time 26 universities or colleges in this country which are offering approved public health nursing programs of study for graduate nurses. In view of the rapid advances and shifts of emphasis in the fields of medical, public health, and allied sciences, a need was recognized by those primarily concerned with public health nursing education for: (1) reëvaluating and re-defining objectives and functions in the field of public health and of public health nursing; and (2) the subsequent revision of public health nursing curricula in terms of present-day needs and trends.

The National Organization for Public Health Nursing, in its endeavor to promote such a study, requested the assistance of one of the public health nursing consultants of the U. S. Public Health Service to direct this project, and in response to this request, on February 19, 1940, Mary J. Dunn was assigned to this study. A working committee and an advisory committee\* were then appointed by the N.O.P.H.N. and the U. S. Public Health Service; the former, to define the scope and objectives and to give general direction to the study; the latter, to advise the working committee and to interpret the objectives and progress of the study to interested individuals and groups.

In order to reach some logical agreement relative to the professional content of a public health nursing cur-

riculum, it was proposed to outline the public health objectives pertaining to each functional area (for example: maternal health, tuberculosis control), and, in the light of these objectives, to re-define the functions of the public health nurse. These newly defined objectives and functions will, in turn, serve as the bases or guide posts for the revised curriculum content.

A tentative draft of public health objectives and public health nursing functions pertaining to 16 functional areas has been prepared by Miss Dunn, in collaboration with various specialists in the respective fields, and was approved by the working committee at its meeting in Detroit, October 5, 1940.

The next step proposed by the working committee is the appointment of 16 production committees to correspond to the 16 functional areas previously agreed upon. Each production committee, in consultation with advisers in allied or special fields, will be responsible for the preparation of an assigned unit of instruction. These production committees are to be composed of public health nurses, and are to center geographically about the 26 universities or colleges now offering approved public health nursing programs of study. Representation on these committees is to include the respective public health nursing programs of study, and also urban, rural, official and non-official public health agencies, located within a reasonable radius of the university or college so as to facilitate working arrangements and travel.

SOUTH AMERICAN CONFERENCES

TENTATIVE dates for South American meetings are as follows:

Fourth Pan American Conference of Directors of Public Health. Rio de Janeiro, Brazil; 1942.

Fourth Pan American Conference of Leprology. Rio de Janeiro, Brazil; 1945.

Eighth Congress of the Pan American Medical Association. Buenos Aires, Argentina; 1941.

\* The membership of these committees will be found in *Pub. Health Nurs.*, 32:208 (Mar.), 1940.

## HEALTH FILMS FOR LAY AUDIENCES

**A** CATALOGUE of Sources of Health Films for Lay Audiences has been published by the National Health Council and may be purchased at \$.10 per copy from the Council, 1790 Broadway, New York, N. Y. The sources are limited to those of nation-wide distribution and to 16 mm. prints of motion pictures on given health subjects. The table of contents includes: Subject-Source Index, List of Sources, Films Produced by State Departments of Health, Film Libraries for Schools and for General Educational Purposes, and Catalogs.

## SUFFOLK COUNTY, N. Y., ESTABLISHES MENTAL HYGIENE DIVISION

**A** DIVISION of Mental Hygiene will be established in the Suffolk County Department of Health, according to a recent announcement, from Riverhead, N. Y.

The personnel will consist of a psychiatrist, psychologist, and two psychiatric social workers, together with a clerk.

The unit will be ready to function about the 1st of January, 1941.

## ILLINOIS PUBLIC HEALTH ASSOCIATION ORGANIZED

**T**HE Illinois Public Health Association, which proposes to apply for affiliation with the American Public Health Association, was organized at Springfield, December 5, 1940, at a special meeting called in conjunction with the annual Illinois Conference on Public Health. Constitution and by-laws were adopted and officers elected. The officers and members of the governing council of the new association include the following:

*President*—Arlington Ailes, M.D., Health Officer of LaSalle, Peru, and Oglesby  
*Vice-President*—B. K. Richardson, Chief, Division of Public Health Instruction, State Department of Public Health  
*Secretary-Treasurer*—Howard A. Orvis, M.D., Health Officer of Winnetka

## ILLINOIS CONFERENCE ON PUBLIC HEALTH

**T**HE 16th annual Illinois Conference on Public Health, held in Springfield, December 5-6, 1940, attracted more than 600 delegates, mostly health officers, public health nurses, sanitary engineers, laboratory technicians, and milk sanitarians. Among those on the program were:

Harry S. Mustard, M.D.—Columbia University, New York, N. Y.  
 Benjamin G. Horning, M.D.—Associate Field Director, A.P.H.A.  
 Halbert L. Dunn, M.D.—U. S. Bureau of the Census, Washington, D. C.  
 J. Ernestine Becker—Johns Hopkins University, Baltimore, Md.  
 Louise Knapp, R.N.—Washington University, St. Louis, Mo.  
 H. A. Holle, M.D.—U. S. Public Health Service, Washington, D. C.  
 Richard E. Shope, M.D.—Rockefeller Institute for Medical Research, New York, N. Y.  
 W. F. Walker, Dr.P.H.—The Commonwealth Fund, New York, N. Y.  
 Bert I. Beverly, M.D.—Rush Medical College, Chicago, Ill.  
 D. C. Elliott, M.D.—U. S. Public Health Service, Washington, D. C.

## FLORIDA PUBLIC HEALTH ASSOCIATION ELECTS OFFICERS

**T**HE Florida Public Health Association held its Twelfth Annual Meeting in Tampa, December 5-7. The following officers were elected for 1941:

*President*—L. J. Graves, M.D.  
*1st Vice-President*—J. S. Spoto, M.D.  
*2nd Vice-President*—Mrs. Mary Matthews  
*Secretary-Treasurer*—Edward M. L'Engle, M.D.

and for the Board of Directors:

Dr. A. P. Black, Mrs. Jean Henderson, George N. MacDonell, M.D., Katherine Corbin, F. V. Chappell, M.D., A. B. McCreary, M.D., with the four officers.

Mark F. Boyd, M.D., of Tallahassee, was selected as representative to the Governing Council of the A.P.H.A., with Dr. J. R. McEachern, of Tampa, alternate.

## LILLIAN D. WALD MEMORIAL SERVICES

LILLIAN D. WALD, founder of the Henry Street Settlement and of the Visiting Nurse Service of New York, who died September 1, was honored at a memorial service in Carnegie Hall on December 1, which was attended by twenty-five hundred persons. The Association was officially represented by Dr. Louis I. Dublin.

Tribute was paid to Miss Wald in addresses and messages from high officials of the nation and friends, led by President Roosevelt. The President's telegram declared that "The Henry Street Settlement with its superb record in bringing light to dark places and joy to hearts that had known only sorrow is her true monument."

Miss Wald was lauded by the speakers, among whom were Mary Beard and Professor C.-E. A. Winslow, for helping New York State to enact the first labor code in the country, for advocating extension of benefits of workmen's compensation in cases of occupational disease, the widows' pension system and the issue of bonds to raise money for the chain of state hospitals for the insane.

The entire personnel of the Visiting Nurse Service of New York, 265 nurses, attended the services in uniform.

## NEW SOCIAL HYGIENE CLINICS

THREE free social hygiene clinics have been opened in Cook County, Chicago, Ill., through funds obtained under the National Venereal Disease Control Act.

The clinics are in the Berwyn, Maywood, and Robbins Health Centers. Additional clinics will be opened soon in Cicero, Harvey, and Chicago Heights.

## WEST VIRGINIA PUBLIC HEALTH ASSOCIATION ELECTS OFFICERS

AT its Annual Meeting, held in Morgantown early in November, the West Virginia Public Health As-

sociation elected the following officers for 1941:

*President*—Edward G. McGavran, M.D., Morgantown  
*1st Vice-President*—John D. Spiggle, Point Pleasant  
*2nd Vice-President* — Cecelia Robrecht, Wheeling  
*Secretary-Treasurer* — Dorothea Campbell, Charleston

## CUBAN GOVERNMENT HONORS DR.

MC CREARY AND DR. UPCHURCH

DECORATIONS of the Order of Carlos J. Finlay were presented to Dr. A. B. McCreary, State Health Officer of Florida, and Dr. Noble Upchurch, Health Officer of Jacksonville, Fla., at the 12th Annual Meeting of the Florida Public Health Association, held in Tampa, December 5-7. The decorations were presented on behalf of the Cuban Government by Dr. Felix Hurtado, Assistant Secretary of Health of Cuba.

## PERSONALS

## Central States

RICHARD F. BOYD, M.D.,† Assistant Director of Child Hygiene, State Department of Health, Topeka, Kans., has been appointed Director of Local Health, a position left vacant since the death of ROLLA B. STAFFORD, M.D.† PAUL R. ENSIGN, M.D.,† of Sparta, Ga., has resigned as Director of the Child Health Demonstration in Hancock County, to become Assistant Director of Child Hygiene in Topeka, succeeding Dr. Boyd.

JOHN A. COWAN, M.D.,† formerly of Bismarck, resigned his position as Director of the Division of Preventable Diseases, North Dakota State Department of Health, effective October 31. On November 2, he began his new duties as Medical Director of Woodbury County Health Department, Sioux City, Ia.

† Member A.P.H.A.

DR. OTTO K. ENGELKE, of West Union, Ohio, has resigned as Health Officer of Adams County, to join the Kellogg Foundation, Battle Creek, Mich.

HARRY H. ENNIS, M.D., C.P.H.,† of LeMars, Ia., formerly Medical Director of District Number 1, has been placed in charge of the Northeastern Iowa Health Unit, with offices in Decorah.

DR. SEYMOUR FISHER, recently Medical Director of the Soldiers' and Sailors' Children's School Hospital, of Normal, Ill., has been appointed Superintendent of the Division for Handicapped Children in the Illinois State Department of Public Welfare, Springfield. He succeeds DR. PAUL H. HARMON, who resigned late in 1939.

LLOYD J. FLORIO, M.D., M.P.H.,† recently associated with the W. K. Kellogg Foundation in Calhoun County, Marshall, Mich., has been appointed Associate Professor of Preventive Medicine at the University of Colorado School of Medicine, in Denver.

CHESTER A. HICKS, M.D.,† formerly of Ann Arbor, Mich., has been elected Commissioner of Health for the district comprising Bleckley and Dodge Counties, with headquarters in Eastman, Ga. The formation of this district necessitates transferring Dodge County from the Southeastern to the East Central health region.

DR. LYMAN F. HUFFMAN, of Cleveland, Ohio, has been appointed a member of the Ohio Public Health Council, to succeed DR. CLYDE L. CUMMER, of Cleveland, resigned.

DR. JONAS L. HURST, of Dorset, Ohio, has resigned as Health Officer of Ashtabula County.

GEORGE D. LUMMIS, M.D.,\* has recently celebrated his golden anni-

versary as Health Officer of Middletown, Ohio.

DR. FRANCIS E. MAHLA, of Marion, Ohio, has been appointed Health Officer of Sandusky and Erie County, to succeed the late FREDERICK M. HOUGHTALING, M.D.\* Dr. Mahla was formerly Assistant State Health Director.

DR. HARRY A. NEISWANDER, of Pandora, Ohio, has been appointed Health Commissioner of Putnam County, succeeding DR. LOUIS M. PIATT, of Ottawa, resigned.

DR. WOODROW L. PICKHARDT, formerly of Chicago, has been appointed Health Officer of a new unit in Creek County, with headquarters in Sapulpa, Okla.

EDWARD D. RICH, C.E.,\* of Lansing, Mich., associated with the State Department of Health for 29 years and for 27 years Director of the Bureau of Engineering, has retired. JOHN M. HEPLER, C.E.,\* with the Department since 1919, has been appointed to succeed him.

DR. ROBERT J. SCHNECK has been appointed to the Public Welfare Commission of Detroit, Mich., succeeding DR. FREDERICK H. COLE.

RICHARD SEARS, M.D.,† of Fremont, Mich., Director of the Tri-County Health Unit composed of Newaygo, Oceana, and Lake Counties since October, 1938, has been named Director of the Muskegon County Health Department, succeeding REUBEN J. HARRINGTON, M.D.†

LIEUT. WILLARD S. SITLER† is on military leave from his position as Sanitary Engineer at the St. Joseph County Health Department, Michigan, and is working on design and construction of Sanitary Sewers and Sewage Treatment Plant for a new cantonment area.

#### Eastern States

EARNEST M. MORRIS, M.D., C.M.,

\* Fellow A.P.H.A.

† Member A.P.H.A.

C.P.H.,\* of Westfield, Mass., has been appointed Director of Public Health in Newton, Mass. Dr. Morris has been serving as District Health Officer for the Massachusetts Department of Public Health with headquarters at Westfield State Sanatorium. He succeeds HAROLD D. CHOPE, M.D., Dr.P.H.,\* who has recently accepted a 3 year Rockefeller Foundation fellowship at Harvard University and Harvard School of Public Health. CHARLES E. GILL, M.D.,† associated with the Massachusetts Department of Public Health in various capacities since 1932, has succeeded to the duties of the Westfield District Office.

JAMES A. TOBEY, Dr.P.H.,\* of New York, N. Y., has been appointed chairman of the committee on food and nutrition in national defense of the Institute of Food Technologists. Dr. Tobey is Director of the Department of Nutrition of the American Institute of Baking, and is also a lieutenant colonel in the Sanitary Corps Reserve of the Medical Department of the Army. The Institute of Food Technologists was organized as a professional society in 1939, and now has more than 900 members throughout the United States.

GUSTAV TUGENDREICH, M.D.,† of Bryn Mawr, Pa., is engaged on a research on child welfare in Montgomery County, under the joint sponsorship of the Social Economy Department of Bryn Mawr College and the Department of Public Health.

OLIVER E. TURNER, M.D., M.P.H.,† has been appointed in charge of a new Health District for Allegheny County outside Pittsburgh, with offices in the Falk Clinic.

JOHN H. WATKINS, Ph.D.,\* has been promoted to the position of Associate Professor in Public Health,

Yale University School of Medicine, effective January 1, 1941, according to an announcement of the President of the University.

### Southern States

DR. WILLIAM R. ARMSTRONG has been appointed in charge of the new health unit which has been established in Tishomingo County, with headquarters in Iuka, Miss.

JAMES T. BELL, M.D., of Woodward, Okla., has been appointed Director of the Department of Maternal and Child Health in the State Department of Health, succeeding PAUL J. COLLOPY, M.D.,† of Oklahoma City, who resigned to join the staff of the Children's Hospital, Seattle, Wash.

WILLIAM F. BELL, M.D.,† of Bay Springs, Miss., has been appointed Director of the new District Health Unit which has been established, comprising Jasper and Smith Counties, with offices at Raleigh and Bay Springs.

WILLIAM A. BLAKE, M.D., formerly of Blountville, Tenn., has been appointed Health Officer of Washington County, Chatom, Ala., succeeding THOMAS T. BOX, M.D.†

THOMAS T. BOX, M.D.,† Health Officer of Washington County, with headquarters in Chatom, Ala., has been appointed in charge of Choctaw County, with offices in Butler. He succeeds DAVID B. SNELLING, M.D., who went to Green County.

DR. MILDRED E. BURTON, of Berea, Ky., has been appointed Health Officer of Owsley County.

DR. NEIL E. COMPTON, of Warren, Ark., has been appointed Director of the Bradley County Health Unit.

DR. ISEE L. CONNELL, of Birmingham, Ala., has been appointed Health Officer of Cleburne County, succeeding DR. FRANK R. WOOD, of Heflin, whose term expired.

ROBERT WEBSTER CROWELL, M.D., of

\* Fellow A.P.H.A.

† Member A.P.H.A.

- Mullins, S. C., has been appointed Health Officer in Chilton County, succeeding SAMUEL D. STURKIE, M.D., C.P.H.,† of Clanton, Ala., who resigned to join the Virginia State Department of Health with headquarters in Charlottesville.
- HUGH S. CUMMING, M.D.,† Director of the Pan American Sanitary Bureau, Washington, D. C., has recently been elected President of the Gorgas Memorial Institute.
- DR. JULIAN W. DAVIS, of O'Donnell, Tex., has been appointed Health Officer in charge of Henry County, Ala., succeeding DR. GEORGE E. MADDISON, who resigned to offer his services to the Canadian Army.
- DR. LOUIS K. HUNDLEY, of Warren, Ark., formerly Health Director of Bradley County, has been assigned to the Trachoma Control Service of the State Board of Health.
- DR. JOHN BOLLING JONES, of Petersburg, Va., has been appointed a member of the State Board of Health, Richmond.
- DR. JOSEPH H. KING, of Summerton, S. C., has been appointed Health Officer of Chester County, to succeed DR. YEADON M. HYER, recently transferred to Hampton and Alledale Counties.
- DR. EDWARD W. KISSEL, of Paintsville, Ky., has been named Health Officer of Lawrence County, with headquarters at Louisa.
- DR. GARDNER H. LANDERS, of Texarkana, Ark., has been appointed Health Director for Independence County.
- DR. HAROLD W. LONG, of Milledgeville, Ga., has been appointed Director of the Crippled Children's Division of the State Department of Public Welfare.
- DR. LLOYD W. LUTTRELL, of Spartanburg, S. C., has been named Health Officer of Pickens County.
- BERT H. MALONE, M.D., C.P.H.,† of Waycross, Ga., has resigned as Medical Director of the Southeastern Health Region.
- HENRY E. MELENEY, M.D.,\* Associate Professor of Preventive Medicine and Public Health, at the Vanderbilt University School of Medicine, has been appointed Hermann M. Biggs Professor of Preventive Medicine and Director of the Laboratories of Preventive Medicine at the New York University College of Medicine, succeeding HARRY S. MUSTARD, M.D.\*
- DR. WILLIAM G. MORGAN, of Cadiz, Ky., Health Officer of Trigg and Lyon Counties, has been appointed Health Officer of Daviess County, with headquarters in Owensboro. He succeeds DR. WILLIAM LEE TYLER, JR., who has been part-time Health Officer.
- DR. EWING M. NIXON, of Little Rock, Ark., has been appointed Director of the Mississippi County Health Unit, with headquarters at Blytheville. He succeeds ROY E. SCHIRMER, M.D.†
- ELDRIDGE T. NORMAN, M.D.,† Health Officer of Marengo County, has been appointed in charge of Hale County, with headquarters in Greensboro, Ala., succeeding BENJAMIN M. DRAKE, M.D.,† who resigned recently.
- DR. MARION L. SHADDIX, of Phenix City, Ala., Health Officer of Russell County, has been appointed in charge of Clay County.
- ARTHUR M. SHELAMER, M.D., C.P.H.,† of Athens, Ala., has been appointed Health Officer in temporary charge of the Limestone County Health Unit, succeeding FRANK M. HALL, M.D.,† of Athens, who resigned for a year's study at Johns Hopkins School of Hygiene and Public Health.
- DR. RALPH E. WEDDINGTON, formerly of Fort Smith, Ark., has been named

\* Fellow A.P.H.A.

† Member A.P.H.A.



Medical Director of District No. 17, with headquarters at Melbourne.

#### Western States

DR. RUSSEL L. BAKER, of White County, Wash., has been appointed Health Officer for Klickitat County.

DR. RALPH M. DEBIT, of Kennewick, Wash., has been appointed Health Officer and County Physician of Benton County, succeeding the late DR. LEGRAND SPAULDING.

J. C. GEIGER, M.D.,\* Director of Public Health of the City and County of San Francisco, has been notified by the Consulate General of Mexico that the Mexican Government has "officially recognized his distinguished services in his field" and conveys "gratitude and appreciation of his work."

HOWARD L. McMARTIN, M.D.,† of Boise, Idaho, has resigned as Director of Public Health of Idaho and has accepted a position as Director of Health of Maricopa County, Ariz.

FREDERICK P. PERKINS, M.D.,† of Phoenix, Ariz., recently appointed Secretary and State Superintendent of Public Health, left with the 158th Infantry of the Arizona National

Guard for training camp at Fort Sill, Okla., on September 23.

JAMES R. SCOTT, M.D., Ph.D.,\* of Albuquerque, N. M., has been appointed State Director of Public Health. The position has been vacant for several months since EDWIN B. GODFREY, M.D.,† resigned because of ill health.

JAMES F. WORLEY, M.D.,† Senior Surgeon, U. S. Public Health Service, Medical Director of the Alaska Division of the Indian Medical Service, Juneau, has been transferred to Minneapolis as Medical Director of District No. 1, comprising the states of Michigan, Wisconsin, Minnesota, Iowa, Nebraska, and North and South Dakota.

#### Canada

ROBERT D. DEFRIES, M.D.,\* has been appointed Director of the School of Hygiene and of the Connaught Laboratories, University of Toronto, Toronto, Ont. During the past 25 years he has been prominent in the work of these two institutes, having become associated early in 1915 with the late J. G. FITZGERALD, M.D.,\* whom he now succeeds. Dr. Defries is Vice-President of the American Public Health Association.

\* Fellow A.P.H.A.

† Member A.P.H.A.

## CONFERENCES AND DATES

American Association of Schools of Social Work. Chicago, Ill. January 30–February 1.

American Camping Association—18th Annual Convention. Wardman-Park Hotel, Washington, D. C. February 13–15.

American College of Physicians—25th Annual Session. Statler Hotel, Boston, Mass. April 21–25.

American Library Association. Mid-

winter Conference, Chicago, Ill., December 27–30. Annual Meeting, Boston, Mass., June 19–25.

American Medical Association—92nd Annual Meeting. Cleveland, Ohio. June 2–6.

American Orthopsychiatric Association—18th Annual Meeting. Theme: Behavior and Its Disorders. Hotel Pennsylvania, New York, N. Y. February 20–22.

- American Public Health Association**—70th Annual Meeting. Convention Hall, Atlantic City, N. J. October 14-17.
- American Society of Civil Engineers.** Winter Meeting—New York, N. Y., January 15-18. Spring Meeting—Baltimore, Md., April 23-26.
- American Society of Heating and Ventilating Engineers**—47th Annual Meeting. Hotel Muehlebach, Kansas City, Mo. January 27-29. (Summer Meeting—San Francisco, Calif., June 16-20.)
- American Water Works Association**—61st Annual Convention. Royal York Hotel, Toronto, Ont., Canada. June 22-26.
- New York Section**—Syracuse, N. Y. March 27-28.
- Indiana Section**—Indianapolis, Ind. April 24-25.
- Ohio Section**—Cincinnati, Ohio. May 15-16.
- Pacific Northwest Section**—Seattle, Wash. May 8-10.
- Southeastern Section**—Charleston, S. C. May 12-14.
- Southwest Section**—Fort Worth, Tex. October 13-16.
- Four States Section**—Baltimore, Md. November 6-7.
- Child Labor Day.** Sponsored by the National Child Labor Committee. 36th Annual Observance. Jan. 25-27.
- Coloradó Public Health Association.** La Junta, Colo. May.
- Congress on Industrial Health**—Third Annual—sponsored by the American Medical Association. Palmer House, Chicago, Ill. January 13-14.
- Florida Public Health Association.** Orlando, Fla. December, 1941.
- Greater New York Dietetic Association.** Lecture by Robert R. Williams, Sc.D., on: "The Evolution of Man's Dietary Requirements." The Academy of Medicine, 2 East 103rd Street, New York, N. Y., February 4 (8.30 P.M.).
- Group Health Federation of America**—Third Annual Convention. Los Angeles, Calif. June.
- Heating, Piping & Air Conditioning Contractors National Association.** San Francisco, Calif. June 16-20.
- Industrial Public Health Nursing Services Symposium.** Hotel Wisconsin, Milwaukee, Wis. February 20-22.
- Massachusetts Public Health Association.** January 30.
- Michigan Public Health Association.** Grand Rapids, Mich. November 12-14.
- Missouri Public Health Association.** St. Louis, Mo. April.
- National Public Housing Conference.** New York, N. Y. January 24-26.
- New Mexico Public Health Association.** Gallup, N. M. October.
- Ohio Federation of Public Health Officials.** Columbus, Ohio. May 23.
- Pacific Heating and Air Conditioning Exposition.** Exposition Auditorium, Civic Center, San Francisco, Calif. June 16-20.
- Smoke Prevention Association of America, Inc.**—35th Annual Convention. Ansley Hotel, Atlanta, Ga. June 3-6.
- Social Hygiene Day**—Fifth National. February 5.
- Society of Illinois Bacteriologists**—Winter Meeting. Board of Trade Building, Chicago, Ill. January 31.
- Southern California Public Health Association.** Los Angeles, Calif. January.
- Tennessee Public Health Association.** Nashville, Tenn. May.
- Western Branch, American Public Health Association**—12th Annual Meeting. San Diego, Calif. May 26-30.

#### Foreign

- International College of Surgeons.** Mexico City, Mexico. August 10-13.
- Pan American Medical Association**—8th Congress. Buenos Aires, Argentina. 1941.

A MARK  
OF  
*Distinction*  
FOR  
**VITAMIN D  
PRODUCTS**



True distinction can only be attained through merit which has been earned.

Consistent, energetic, well-directed effort in laboratory and clinic, the results of which have been carefully and scientifically tabulated over a period of some fifteen years, give distinctive meaning to the Foundation's Seal. Bioassays for Vitamin D, conducted to U. S. P. standards, fill 60,000 pages of records on 200,000 rats used to check the Vitamin D potency of Foundation-licensed products.

Carefully recorded independent clinical studies of the Vitamin D value of Foundation-licensed products on more than 3,000 children are regimented behind this Seal. Competent investi-

gators work independently at leading hospitals and clinics. Their findings, published in the recognized professional journals, emphasize the importance of this Seal and its message—"Approved for Vitamin D upon periodic tests."

Every Vitamin D product licensed by the Foundation under its famous Steenbock patents is entitled to carry this Seal of distinction. All licensed products are regularly tested, whether or not the Seal appears thereon. Thus, any reference to Foundation licensing appearing on any product package or in its advertising permits you to use, prescribe and recommend that product with utmost assurance of its uniform Vitamin D potency.



**ABOUT THE FOUNDATION**—The Wisconsin Alumni Research Foundation is an organization not for private profit, formed to receive and administer patentable discoveries voluntarily assigned. Its trustees are alumni who give their services to the Foundation without compensation. All net avails are devoted to scientific research. At present, some 130 projects are under way, being supported by funds appropriated by the Foundation. A comprehensive outline of the history and activities of the Foundation is given in the booklet, "Scholars from Dollars," a copy of which will be sent to you upon request.

**WISCONSIN ALUMNI RESEARCH FOUNDATION, MADISON, WISCONSIN**

## *Complications in Measles can be markedly reduced with*

### IMMUNE GLOBULIN (Human) *Lederle*

CLINICAL INVESTIGATORS<sup>1</sup> have been in accord that prophylactic treatment has reduced the severity of measles in susceptible contacts. With a possible peak in the incidence of measles approaching, the physician may rely upon the conveniently available "Immune Globulin (Human) Lederle" for effective modification of the disease.

"Immune Globulin (Human) Lederle" is a clear, highly refined product. Reactions are few and of a mild character. The product is of uniformly high potency as indicated by its content of diphtheria antitoxin.

From a practical point of view "Immune Globulin (Human) Lederle" possesses these definite advantages:

*Universally available*—placentas are more easily obtained than convalescent or adult sera, the extract readily prepared and stored under standard conditions,

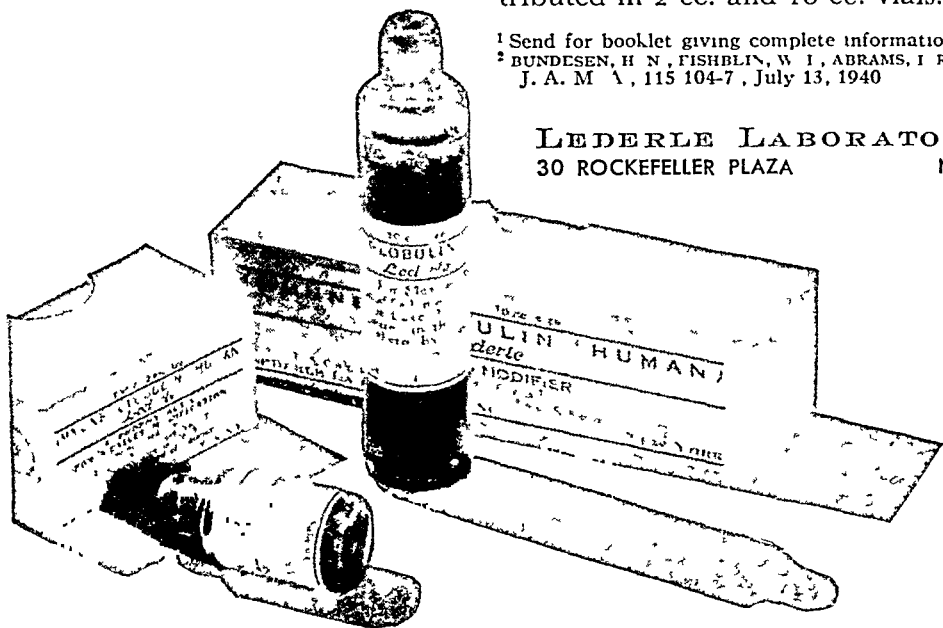
*small dose*—the dose (bulk) used in a recent large scale study<sup>2</sup> was about two-thirds that of convalescent serum. Where adult blood has been used the doses have been much greater,

*uniform antibody content*—the number of placentas used in the preparation of each extract has been increased from 1,000 to 5,000. Thus an even more constant protective power may be assured.

"Immune Globulin (Human) Lederle" is distributed in 2 cc. and 10 cc. vials.

<sup>1</sup> Send for booklet giving complete information and bibliography  
<sup>2</sup> BUNDESEN, H. N., FISHBLIN, W. I., ABRAMS, I. R., and MILLER, R. D.,  
J. A. M. A., 115:104-7, July 13, 1940

LEDERLE LABORATORIES, INC.  
30 ROCKEFELLER PLAZA NEW YORK, N. Y.



# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

February, 1941

Number 2

## CONTENTS

	PAGE
Maternal and Child Health Programs Under the Social Security Act . . . <i>Edwin F. Daily, M.D.</i>	117
The Merit System in Relationship to Public Health Personnel . . . . . <i>Frank L. Roberts, M.D., and Byron Hill, Ph.D.</i>	121
Uses of a Lauryl Sulfate Tryptose Broth for the Detection of Coliform Organisms . . . . . <i>W. L. Mallmann, Ph.D., and C. W. Darby, D.V.M.</i>	127
Secondary Attack Rates in Pneumonia: A Study of 13,500 Household Contacts . . . . . <i>Edward S. Rogers, M.D., Morton Robins, and Margaret G. Arnstein, R.N.</i>	135
Laboratory Studies of Methods for Cleansing of Eating Utensils and Evaluating Detergents . . . . . <i>F. W. Gilcreas and J. E. O'Brien</i>	143

Continued on page vi

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear. These are not to be regarded as expressing the views of the American Public Health Association unless formally adopted by vote of the Association.

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Reader's Guide in your Library.

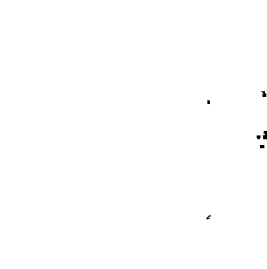
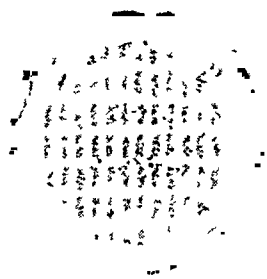
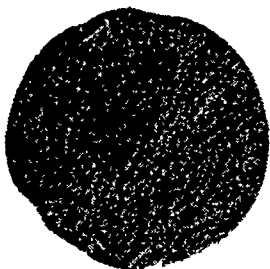
Published by the American Public Health Association at 374 Broadway, Albany, N. Y.  
Executive Office, 1790 Broadway at 58th St., New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States, Cuba and Mexico, South and Central America; \$5.50 for Canada; and \$6.00 for other countries. Single copies 50 cents postpaid. Copyright, 1941, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor, H. S. Mustard, M.D., 600 W. 168th Street, New York, N. Y.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 1790 Broadway at 58th St., New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.



#### Rapid-Flo vs. Another Cotton Disk

Rapid-Flo, the lower disk, caught dirt the upper disk failed to remove. Upper disk is neither best nor worst of competitive disks in the market. This test shows "just any cotton disk" is not enough.

#### Rapid-Flo vs. Flannel

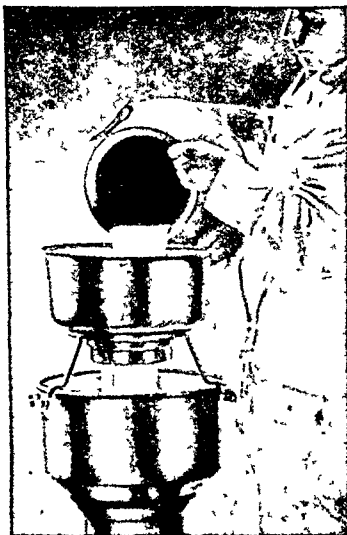
Rapid-Flo, the lower disk, caught the dirt the flannel failed to remove. The flannel used in this test is the grade most generally used in the sections where flannel is still permitted.

#### Rapid-Flo vs. Rapid-Flo

But Rapid-Flo does it the first time! The second Rapid-Flo Disk, above, had no work to do. Rigid manufacturing standards of weight and quality assure remarkably uniform performance of Rapid-Flo.

## CROSS-FILTRATION TEST

to determine relative efficiency



● This test was devised as a simple method of evaluating disk performance. Try it. Set one strainer above another as shown in picture at left. Put any other disk in top strainer, and a Rapid-Flo Disk in lower one. Split a run of unfiltered milk in two equal parts. Pour one half through this set-up. In most cases it will be found that sediment has passed through the upper disk; the sediment being caught by the Rapid-Flo Disk. Then put the rest of the milk through two Rapid-Flo Disks, one in each strainer. See how clean the lower Rapid-Flo Disk is, indicating a thorough job the first time. Need more be said?

## RAPID-FLO FILTER DISKS

All Standard Sizes . . . Natural Finish, Single-Faced and Double-Faced

*Johnson & Johnson*  
NEW BRUNSWICK, N. J. CHICAGO, ILL.

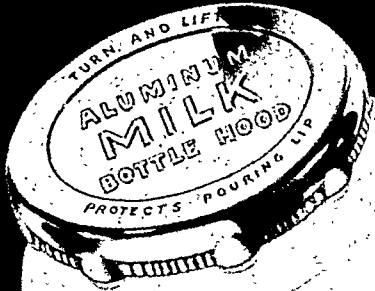
# Contents—Continued

	PAGE
Analysis of the Present Qualifications of Public Health Nurses in the United States . . . . .	151
<i>Pearl McIver, R.N.</i>	
Setting up New Minimum Qualifications for Public Health Nurses . . . .	158
<i>Dorothy Deming, R.N.</i>	
Health Maintenance in Small Industry . . . . .	162
<i>R. B. Robson, M.D.</i>	
Production and Standardization of Antipneumococcus Serum . . . . .	167
<i>Harold W. Lyall, Ph.D.</i>	
Nutrition Education in a Dental Program . . . . .	171
<i>Ruth L. White</i>	
Possibilities for the Control of Syphilis with the Intravenous Drip Technic of Massive Arsenotherapy . . . . .	176
<i>George Baehr, M.D.</i>	
EDITORIALS:	
Influenza: From Complete Ignorance to a Partial Knowledge . . . .	180
Municipal Public Health Engineering—An Urgent Situation . . . .	182
The Jargon May Get Us If We Don't Watch Out . . . . .	183
Credit Lines: A Selective Digest of Diversified Health Interests— <i>D. B. Armstrong, M.D., and John Lentz, M.S.</i> . . . . .	184
For Your Radio Programs. Pneumonia Therapy. Magazine Articles. Miscellaneous Health Items. Film Notes. "Waste Not—Want Not." Re: Cleveland's Health Museum. Believe It or Not —. Noted and Quoted.	

Continued on page viii

Reprint prices furnished upon request

Type E Alseco Aluminum Hood may be used alone as both a seal and a cover, or may be used over a paper disc.



Type A Alseco Aluminum Hood on Econopour Finish bottle is both a secure seal and sanitary cover. Paper disc may be used if desired.



## GET THE "LOWDOWN" ON HOODS

Caps and hoods for protecting the pouring lip of milk bottles are made in various styles and materials. All have their virtues.

On the public health official who must approve their use in the community rests the responsibility of weighing their relative merits. He must consider many factors...the protection afforded, method of application, consumer convenience, identification markings, cost, appearance and other considerations.

It is no place for snap judgment. Facts are called for, and sober thought.

Hence these two suggestions to health officials:

1. Allow a representative of Aluminum Seal Company to lay before you all the information about

Alseco Hoods that has been revealed by more than 10 years of use in dairies.

2. Check with health officials in some of the 1500 communities where Alseco Aluminum Hoods are in daily use. Get the benefit of their opinions and observations.

Only with all these facts before you can you reach a reasoned decision on the efficacy of Alseco Aluminum Milk Hoods.

Aluminum Seal Company, 1359 Third Avenue, New Kensington, Pennsylvania.

Trade Mark Reg.



U. S. Pat. Off

*Alseco*  
ALUMINUM HOODS



Contents—Continued

	PAGE
Books and Reports . . . . .	189
<p>Bacillary and Rickettsial Infections: Acute and Chronic—Black Death to White Plague. The 1940 Year Book of Public Health. Rheumatic Fever: Studies of the Epidemiology, Manifestations, Diagnosis, and Treatment of the Disease During the First Three Decades. Silicosis—Proceedings of the International Conference Held in Geneva from 29 August to 9 September 1938. Manson's Tropical Diseases (11th ed. rev.). The Virus: Life's Enemy. Your Health: A Guide to the Medicine and Public Health Building, New York World's Fair, 1940. Simplified Diabetic Manual. Borrowed Children: A Popular Account of Some Evacuation Problems and Their Remedies. Food, Nutrition and Health (5th ed.). Holt's Diseases of Infancy and Childhood (11th ed. rev.). Advances in New York City's Health: Annual Report of the Department of Health of the City of New York for 1939. Hugh Young: A Surgeon's Autobiography. Coöperation in the Administration of Tax-Supported Medical Care. Dermatology and Syphilology for Nurses, Including Social Hygiene (3rd ed. rev.). Dietetics Simplified: The Use of Foods in Health and Disease (2nd ed.). Experimental Poliomyelitis. Communicable Diseases.</p>	
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . . .	201
Books Received . . . . .	203
Association News . . . . .	204
<p>A.P.H.A. Attitude Toward the Schwert Bill. Applicants for Membership. Deceased Members. A.P.H.A. Directory of Persons Engaged in Vital Statistics.</p>	
Employment Service . . . . .	207
News from the Field . . . . .	209
Conferences and Dates . . . . .	216

INDEX TO ADVERTISERS

	Page		Page
A. P. H. A. . . . .	X	Eimer & Amend. . . . .	XVII
Book Service . . . . .	XIV, XIX, XX	Federation of Sewage Works Associations	XVI
Membership Application Form. . . . .	XVIII	Fisher Scientific Company. . . . .	XVII
Affiliated Societies and A.P.H.A. Branches	XVIII	Florida Citrus Commission. . . . .	XIV
Aluminum Seal Company. . . . .	VII	Gilliland Laboratories, Inc., The. . . . .	II
American Can Company. . . . .	XXIII	Johnson & Johnson. . . . .	V
American Meat Institute. . . . .	XV	Lederle Laboratories, Inc. . . . .	III
Canadian Public Health Association. . . . .	XXII	National Drug Company, The. . . . .	XI
Disco Laboratories, Inc. . . . .	Back Cover	N.O.P.H.N. . . . .	XXI
Directory of Health Service. . . . .	XXII	Public Health Nursing. . . . .	XXI
Bendiner & Schlesinger Laboratories		Sealright Co., Inc. . . . .	XVI
Black & Veatch		Spencer Lens Company. . . . .	IX
Committee on Administrative Practice,		Squibb & Sons, E. R. . . . .	XVII
A.P.H.A.		Trained Nurse, The. . . . .	XII
Employment Service, A.P.H.A.		Wallace & Tiernan Co., Inc. . . . .	

# American Journal of Public Health

## and THE NATION'S HEALTH

---

Volume 31

February, 1941

Number 2

## Maternal and Child Health Programs Under the Social Security Act\*

EDWIN F. DAILY, M.D., F.A.P.H.A.

*U. S. Children's Bureau, Washington, D. C.*

WHEN we review extension and improvement of health services for mothers and children during the past 4 years we find that there have been definite trends in the methods of administration, in the type and quality of service provided, and in the mortality rates. A few of these trends will be mentioned.

### MERIT SYSTEMS OF PERSONNEL ADMINISTRATION

For the nation as a whole the people are developing a much greater confidence in the health services for mothers and children under the official agencies. Men and women with the best professional training and experience are now being secured for service in the maternal and child health programs. The state health agencies have all adopted the principles of merit systems of personnel administration, and have gradually raised the minimum qualifications required for all types of public health personnel. I predict that at the end of

another 4 years we will look back on this step as one of the most significant and far-reaching improvements of public health service accomplished in this period. Although in 1935 several state health departments were free from political coercion and control, only 11 were working under civil service systems when the Social Security Act was passed.

At present the public health personnel in 19 states are employed under civil service laws and all the other state health agencies are establishing merit systems. Far more important than the type of merit system itself is the almost unanimous desire of public health officials really to maintain their services on a sound merit system basis.

### TRAINING OF PERSONNEL AND GRADUATE EDUCATION

In recent years there has been a decided trend toward the employment by public health agencies of staff physicians who are clinicians trained in a specialty as well as capable administrators. This policy not only has resulted in far better health service in each special field but has also brought

---

\* Read before the Health Officers Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

about an increasing respect for public health by practising physicians and by the public. This change in the field of maternal and child health is striking. In June, 1934, there were only 31 state divisions of maternal and child health, and less than half the states had physicians as directors on a full-time basis. Every state now has a division of maternal and child health, and all are directed by physicians. Most of these directors have had graduate training and experience in either pediatrics or obstetrics, and more than half have had graduate training in public health administration. In addition to the division directors the state agencies are employing 70 full-time medical assistants and consultants with pediatric or obstetric training or experience.

Since the establishment of the social security programs during this 4 year period, the states have paid for the graduate training of 762 nurses, in part or in whole with maternal and child health funds. Many state division directors and their medical and dental assistants also have been provided graduate training.

Postgraduate lecture courses and teaching clinics in obstetrics and pediatrics have been made available at least once to almost every practising physician in the United States, and in many states these courses are now established on a permanent basis. In a few states the full-time obstetricians and pediatricians employed by the health departments and assigned to medical schools primarily for graduate medical teaching also are assisting in improving undergraduate medical education. Postgraduate courses in children's dentistry for practising dentists have been planned and financed by 20 state health agencies. During 1940, the state maternal and child health plans included \$454,448 for various types of postgraduate courses. I do not know of a surer way of improving health

than by strengthening the basic and graduate education of the members of the professions who must ultimately direct or render the actual services to be provided.

We all realize that health cannot be purchased with money, that money itself has never saved a life, that equipment and supplies are wasted unless a trained mind directs their use. Improving health by spending money is possible only when education and care are provided for the people by personnel with training and experience in the various specialties.

#### THE DEVELOPMENT OF CLINICS AND CONFERENCES

The policy of providing prenatal, postpartum, and child health medical services in a clinic or on a conference basis has been accepted in many areas in recent years. Both from an economic and an administrative viewpoint clinics and conferences have in most areas proved the most satisfactory method of providing health services for individuals who could not secure this service from their own physicians. State health departments reported that during the year ending June 30, 1940, they were supervising 2,886 child health centers (48 states) and 1,617 prenatal centers (42 states) where clinics were conducted by physicians at least once a month. Conducted less often than once a month there were 3,124 additional child health centers in 32 states and 373 prenatal clinics in 15 states. More than half of these centers have been established during the past 2 years, and expansion continues to be rapid. The Children's Bureau has recommended that local practising physicians be employed to conduct the clinics and that they be paid for their services. Formerly most of the clinics were conducted by local health officers, who often lacked special training and experience in obstetrics and

pediatrics. In 1936, no practising physicians were paid from state or federal maternal and child health funds for conducting clinics. In 1940, 2,830 practising physicians were paid on a fee basis for conducting child conferences and 1,115 for conducting prenatal clinics. This year over \$410,000 is budgeted for payment of clinic fees to local physicians. Many of the states employ full-time or part-time obstetricians or pediatricians to supervise the clinics and to improve the services provided. Other states require that local physicians employed for this work must attend a short intensive course on the conduct of such clinics or conferences. As a result of the expert supervision, the special training of clinic physicians, and the improvement of clinic equipment, a higher standard of clinic service is now being rendered than heretofore. The local health departments have also found that employing the best qualified local practising physicians and dentists not only has improved the services rendered but has brought about a much better working relationship with the local professional groups.

#### MEDICAL AND HOSPITAL CARE

There has been an increasing realization in recent years by public health agencies that their responsibilities should not end with the provision of strictly educational and preventive health measures. It is futile to teach a mother the importance of good prenatal care unless that care is available to her, and it is often a waste of money to provide prenatal care if proper care at the time of delivery is not available. Twenty-six state health agencies are now spending part of their maternal and child health funds for medical or hospital care of maternity patients and sick children. I hope that many of you will have an opportunity to study these services in such areas as Slossfield

Health Center in Jefferson County, Ala., Anne Arundel County, Md., Alger-Schoolcraft Counties, Mich., Cherokee County, Okla., and San Miguel County, N. M. From these and several similar projects we are learning how to co-ordinate better preventive health measures with services providing treatment under the administration of local health departments. Approximately \$500,000 of maternal and child health funds are budgeted this year to pay practising physicians for case consultations, delivery care, clinic service, and care of sick children, and \$140,500 is budgeted this year for hospital care of mothers and children.

#### PUBLIC HEALTH NURSING SERVICE

The development of public health nursing service for mothers and children is by far the largest item in all the state maternal and child health programs. More than 4,000 public health nurses are paid in whole or in part from maternal and child health funds, and this year the states plan to spend more than 5 million dollars of their maternal and child health funds for nursing services. In spite of the considerable increase in the number of public health nurses in recent years, the states reported last year that more than 1,000 counties had no public health nurses rendering any service to maternity patients. The concept of a generalized, family public health nursing service has been continually emphasized by the Children's Bureau in the development of the maternal and child health programs. We rarely see now the duplication of effort and service formerly observed when a family might be served by a school nurse, by a child hygiene nurse, by a communicable disease nurse, and so forth. The quality of individual generalized nursing service has been immeasurably improved by the state administrative plan of employing specialized nursing consultants in

maternity and pediatrics who have been responsible for advising and assisting local staff nurses in their work. We believe that the development of nursing care at the time of home delivery, and nursing visits within 24 hours of home delivery will prove to be most significant in lowering maternal and newborn infant mortality or morbidity.

#### NUTRITION SERVICES

Only 11 nutritionists were employed under the state maternal and child health plans approved in 1936. Four years later 27 states were employing 50 nutritionists under their maternal and child health plans. There has been a marked increase in the realization of the importance of teaching sound principles of nutrition as a basic part of any program which plans to improve the health of mothers and children.

#### CARE OF PREMATURE INFANTS

Reduction of the excessive mortality from premature births is a problem which has confronted all states. This problem is being met not only by providing special programs of education for the medical and nursing professions but by the establishment and maintenance in 20 state health departments this year of hospital or home facilities for the proper care of these infants.

#### MORTALITY RATES

If we can accept maternal and infant mortality reports as an indication of the success of our efforts to improve maternal and child health, there is much to be grateful for. There are about 10,000 mothers living in the United States today who would have died in the past 4 years if the maternal death rate of 1935 had prevailed. There are about 28,000 children living in the United States today who would have died in infancy during the past 4 years if the infant death rate of 1935 had prevailed.

If the low maternal mortality rate reported by North Dakota in 1938 had been effective for the entire United States there would have been only 5,489 instead of 9,953 maternal deaths that year. If the low infant mortality rate reported by Connecticut and Nebraska in 1938 had applied to the entire United States there would have been only 82,331 instead of 116,702 infant deaths.

The decrease in the maternal mortality rate from 1935 to 1938 among white women has been much greater than among Negro women, and in 1938 the rate for Negro women was for the first time more than twice as high as for white women (86 and 38). Measures to improve the health of Negro mothers apparently have not kept pace with those for the white population.

We have only begun to develop on a nation-wide basis the standards of health for mothers and children which are possible with the knowledge at hand and the potential resources of our country. We are now becoming increasingly aware of the need for total defense. We should be thankful that an extensive program for strengthening national health services for children has been under way for more than 4 years under the Social Security Act, for the health of our children is a vital part of our defense. It is a crucial time to protect the gains which we have made, for to lose these gains in an effort to defend them would be a tragic blunder. We should now, more carefully than ever before, scrutinize every expenditure of the maternal and child health funds and answer the question whether each service will lead to an improved health and physical fitness of the children of America. It is urgent, indeed, that we give immediate consideration to methods whereby we can extend to all communities the services which will assure a maximum of health for our next generation.

# The Merit System in Relationship to Public Health Personnel

FRANK L. ROBERTS, M.D., AND BYRON HILL, PH.D.

*Professor of Preventive Medicine, University of Tennessee, Memphis, Tenn.; and  
Supervisor of Examinations, Tennessee Civil Service, Nashville, Tenn.*

THE meaning and principle of civil service have had an evolutionary growth. Originally, in the United States, the term was a generic name given to the public servants of a state employed in a civil capacity. This is still often the usage in other countries. Today "civil service" signifies several things: the legislation establishing the system; the officials administering it; those government employees appointed under the system; the procedures, methods, and technics used in the selection of such personnel; and finally the entire bundle of rights, privileges, and protections conferred upon an employee who has "civil service status." In its broadest and proper meaning it includes all of these.

There might very conceivably be a civil service system in which merit of the individual does not govern appointments and retentions; on the other hand, a merit system not based on statutory authorization would not be a civil service system. Generally and for our purpose these terms are used interchangeably to refer to a system of public personnel management in which status is based on considerations of merit and determined objectively by examinations. In some states the label is "merit system"; in Tennessee it is "civil service."

Government on the basis of personality and/or political influence with

all of the attendant evils of the patronage system culminated in Great Britain in the reign of George III. This vicious system of government was one of the causes of the American Revolution. Concerning the use of patronage and the giving of important colonial positions to those favored by the administration, Trevelyan says, "It was a system which, as its one achievement of the first order, brought about the American war and made England sick, once for all, of the very name of personal government."

When our nation was established, its founders tried to avoid the evils which they saw had caused the loss to England of the colonies. That these founders intended administrative officers to hold office during good behavior is clear and unmistakable. The Constitution fixed no definite term of office in the executive branch of the government except in the case of the President and Vice-President. During the early years of our history as a nation every administration more or less held to a kind of merit system, and Madison believed that the wanton removal of a qualified public servant was an impeachable offense. Generally speaking, the personnel of the young government was selected on merit.

With the generation of partisanship and the growth of political parties the method of appointment to office

changed. In 1820 the legislative basis for the spoils system was laid in the passage of the Four Year Term Tenure of Office Act. This law was passed without debate and apparently there was little conception of what it really meant. Jefferson, Webster, Clay, Calhoun, Benton, and others condemned the law with all the force of which they were capable, but it remained. The change did not come about at once, but by 1830 the transition was nearly complete and it was an accepted conception of government that "to the victor belong the spoils."

Not only was the spoils system inaugurated by 1830, but it was extended in 1836. The original Tenure of Office Act applied only to those officers charged with the collection of revenue, but in 1836 it was amended to include all postmasters drawing more than \$1,000 a year. Federal employees thus were no longer considered servants of the people, but servants of political bosses and dependent on the President in office. Political expediency dictated the appointment of civil servants, not ability or training to perform a certain task. Thus an era of spoils and corruption ensued. This period reached an ugly climax in the assassination of President Garfield in 1881 at the hands of a disappointed office seeker. It was unfortunate that such a tragedy was necessary to dramatize the evils of the patronage system; but from the death of a President came a determined public demand for an honest and efficient Civil Service.

The National Civil Service Reform League was organized in that same year 1881, a development of the New York Civil Service Reform Association which had begun in 1877. Soon the movement had grown to such an extent that Congressional action was taken in the Pendleton Act of 1883 which established the Federal Civil Service Commission. This Act was based on three funda-

mental principles, which were: (1) that appointments to the classified service should be by competitive examinations and there should be a probationary period before final appointment, (2) that appointments should be apportioned among the states according to population, and (3) that employees should be free from having to contribute to campaign funds or having to render political service.

It has been pointed out by Klein that the rise and extension of federal and state civil service systems have taken place in three great waves and almost in 25 year cycles; these periods were 1883-1884, 1905-1915, and 1936 to the present. Interestingly enough, the growth has paralleled periods of great increase in the regulatory powers of government. Marked increases in U. S. Civil Service coverage have occurred under Cleveland, Theodore Roosevelt, Taft, Wilson, and the present President. Coverage in the federal classified service for June, 1939, was 67.7 per cent of the executive branch.

New York was the first state to establish a merit system. The New York law was passed in 1883, and in 1896 the system was written into the Constitution of that state. In 1884, Massachusetts also pioneered with a merit law. A pause occurred until 1905, when Wisconsin and Illinois passed laws; Colorado made a start in 1907, New Jersey in 1908, and Ohio, California, and Connecticut in 1913. In 1939, legislatures considered merit system proposals for either state or local governments in some 17 states. At the present time many of the states have some type of a merit law, and wherever the system has been given a sound foundation and good administration, it has proved successful.

Public health has not escaped its time serving as a football of politics. Even in this so-called enlightened period, in many states each change of

administration results in a change of health officers. It may be only a coincidence, but those states which have made the best records in health work are usually the ones which have suffered fewest turnovers in administrative officers.

Modern public health technics call for people with very special training, and this fact has kept public health in recent years from being too greatly exploited for political patronage. The public has been educated to expect well trained personnel in public health, and this has been a very powerful force in many states for assuring the public of competent service. The financial participation of the great foundations and the federal government has given added impetus to the introduction of the merit system.

There are many factors that influence qualified persons in the choice of public health as a career. We like to think that opportunity for service is the primary motivating force, but as a matter of fact people go into public health as a career from a variety of reasons. Personal interest in the subject is probably the chief motivation and personal advantages in the way of steady income, assured tenure of office, and chances for professional improvement loom large as reasons for choosing any field as a career. Opportunity for service plays a large part in the choice, but is not, in the great majority of cases, the controlling factor. It is still true that economic motives direct the activities of most of mankind.

Certainly many qualified persons will hesitate to choose public health as a career so long as that field is subject to political chance. The merit system can and will aid greatly in encouraging properly trained personnel to enter the service, and it will keep out the unfit. By assuring tenure of office, dignified treatment, and freedom from unfair political influence, the merit system will

give the individual entering state employment a real chance to render service to the community, and will assure the community of continuing efficient professional service. The use of public health appointments as stepping-stones and stop-gaps to bridge over temporary financial difficulties immediately following graduation can be decreased by the introduction of an efficient and honestly administered merit system.

With these basic principles in mind, the Civil Service Examination Program recently held for the Department of Public Health in the State of Tennessee may be reviewed. We do not mean to suggest that the Tennessee program illustrates in its detail the ideal method and procedure to be followed; it does illustrate that the people of the state have decided that there shall not be the possibility of anything but merit as the measure of the men and women who, as agents of the state, administer and serve its interests in several departments.

Civil service is in its infancy in Tennessee. However, examinations for certain state personnel have been held three times before this year. Under the Wagner-Peyser Act, the federal government conducted merit examinations in 1934 and 1935 for the Employment Service, and in 1938 examinations were given by the State for the Unemployment Compensation Division, both in the Department of Labor. In 1937, Tennessee enacted its first merit system law which created the Department of Personnel; there was a special examinations unit set up for these examinations. In 1939, this Act was repealed and the present broader and more inclusive civil service system was established. The Department of Personnel is continued; an Examination Unit as a part thereof was organized in March, 1940, with a supervisor of examinations in charge under the Director of Personnel. Section 1 of the Tennessee law states its purpose:



There is hereby established for employees of this state a system of personnel administration based on merit principles and scientific methods. That system shall govern the appointment, promotion, transfer, lay-off, removal, and discipline of employees, and other incidents of state employment. Except as hereinafter specified, all appointments and promotions to positions in the State Civil Service shall be made on the basis of merit and fitness, to be ascertained by examinations. The Department of Personnel created by the provisions of Chapter II, Public Acts of 1939, shall administer the provisions of this Act and shall be charged with the duty of progressively improving its effectiveness.

A Civil Service Commission of five members is established by law in the Department of Personnel to represent the public and to advise on problems concerning personnel administration. This commission is composed of prominent business men known for their integrity. The members are appointed by the Governor for a period of years, and receive only nominal compensation for attendance upon meetings. The commission acts as a board of appeal and review for the settlement of grievances under the Civil Service System, and applicants and examinees may appeal thereto from the rating or action of the Examination Unit. The Civil Service Rules and Regulations passed by the commission supplement the law and have the effect of a part thereof.

Three departments of the state government are included in Tennessee's civil service program: The Departments of Public Health, Public Welfare, and Labor. The first civil service examinations in Tennessee were given for the technical positions in public health. The commissioners of this department had for some years maintained a very high standard of qualifications for their personnel. Public announcements for the examinations were made and applications were received in May, 1940. Most of the examinations were held the first part of June. Eligible registers were established the latter part of

September, the entire program covering approximately 4½ months.

There were 5 groups of positions in the 36 technical classifications for public health, divided as follows: Medical 17, Dental 3, Nursing 5, Laboratory 5, and Sanitary Engineering 6. Approximately 325 positions were involved. The requirements of education and experience, although high, cannot be regarded as out of line with civil service requirements for such positions in other states.

The public interest in this first phase of our examination program was gratifying, considering that the program was new and that the positions were of a technical nature for which a large reservoir of qualified persons did not exist in Tennessee. As to be expected, the greatest concentration of applications came from the four urban counties, with the cities of Memphis and Nashville leading in the number of applicants. Counties from which there were few or no applicants showed a striking correspondence to those counties in which there were no full-time health units. A very high percentage of the applicants were incumbents. In the specifications, age limitations for entrance into an approved public health service ranged from a minimum of 21 years for some of the lower classifications (nursing trainee 20 years), to a maximum of 40 years for directors. Of the total applications filed, 93 per cent were accepted as meeting the minimum requirements to be admitted to the examinations.

The examinations were open, free, and competitive, but as to incumbents there was a qualifying element due to the preference given incumbents under the Tennessee Civil Service Rules and Regulations. This provision is that incumbents who make a passing grade on their examinations are certified by the director as regular employees in the classified service. The rules of the examination prescribed a minimum

grade of 70 per cent on the entire examination as the passing grade. Essay questions were used for the written examinations. Examinations and oral interviews were held in four test centers over the state: Johnson City and Knoxville for East Tennessee, Nashville for Middle Tennessee, and Memphis for West Tennessee. There were four different Examining Boards for the Medical and Dental personnel, the Nurses, the Laboratory Technicians, and the Sanitary Engineers. Ninety-four per cent of the examinations taken were passed.

Many things are learned by experience in a civil service examination. Especially remembered from the early stages of our program are the following:

1. The public in general and the personnel of state health departments must be educated to the machinery and the genuineness of civil service. There is a surprising lack of understanding as to how a merit system operates. This is true even among the best educated groups of citizens. Procedures and possibilities must be carefully explained. Everything required or done is theoretically, and should be actually, for the protection of either the applicant or the state. Since most examination programs cannot include in their budgets any item for advertising, the several professional groups included in state health departments have an excellent opportunity through their Associations, and through the medical, dental, nursing, and engineering schools, to assist in making known employment opportunities in state service and the requirements for securing such. The opportunity for coöperation is very great and the challenge for success is on both sides.

2. Procedures required of applicants should be reasonable. On the other hand, certain formalities, as in filing application, are obviously necessary and must be complied with by all alike. Examination programs should not be mysterious; forms should be kept simple; and test items ought to be practical. In any event, the rules of the program once set become as inviolable as the proverbial law of the Medes and the Persians. There can be no exceptions. Without fear or favor, the law must be administered and adhered to impartially and fairly. The public must

remember and appreciate that examination officials have no discretion in the application of the requirements to individuals. When these things are done, public confidence, public interest, and public participation will be secured; and on these three depend the success of any civil service system.

3. In a civil service program for a state department of public health, the professional element involved and the technical nature of the work to be performed in such positions justify careful consideration of the type and content of examinations to be given. For most written examinations, the multiple choice type of question is preferred by a large majority of civil service technicians. Here the candidate is given a series of choices or statements in regard to a premise or subject, and asked to indicate which is the correct or most nearly correct answer. However, in the case of examinations for certain professional groups, the essay or free answer type of question may sometimes be employed. When the items are constructed and graded with the assistance of authorities and experts in these fields, with sufficient time and care exercised by the consultants, good results are possible. Certainly a physician who has been awarded his license to practise medicine by a state medical examining board need not be retested on the fundamentals of his profession. In all cases, it may be said that the higher the specialization, the more technical the field; the greater the experience and training required on the specifications, the less the emphasis that may be placed on written examinations. The federal government gives many unassembled examinations, the type where no written work is required and the candidate is rated solely on the basis of his record, sometimes supplemented by an oral interview.

4. An examination program should allow a considerable length of time for receiving applications for positions in public health work. A month to 6 weeks is advisable. This is necessary because of the publicity to be secured and the qualifications of the group to be attracted. The more technical the positions to be filled, the longer the period needed for adequate and effective recruitment. In the South it might often be necessary to go outside the state for such personnel, and this would require more than the usual time for filing.

5. In view of the demand for qualified persons in the field of public health, it is best not to require state residence in the specifications or rules for the examinations. Especially is this true where the merit system is in its beginning stages or where there have not

been examinations before. Manifestly, a residence requirement is a handicap in the obtaining of technical personnel.

6. The classification in public health departments should be relatively as few in number as possible. It is a good rule to keep the classification plan for any department as simple as can be done consistently with the variations in the general types of duties to be performed.

7. Specifications for the various positions ought to be clearly written and free from ambiguous expressions. From the standpoint of the examination program, the statement of the knowledge and ability required in the execution of the duties to be performed is all-important because upon this the examinations must be based. It is to be expected that the requirements of education and experience for most public health positions will be high.

8. Consultants and examining boards for a public health examination program must be trained in the particular fields in regard to which they are to give advice and service. A separate board for the positions in each different sub-field is highly desirable.

As we have seen, civil service means more than the selection of personnel on the basis of merit. There will follow for the Tennessee Department of Public Health the additional problems of promotion, management, and retention of personnel on the merit principle, and the maintenance of adequate registers for replacement. But with a sound law and sincere officials, there is a great opportunity for a real merit system in the home of Andrew Jackson.

---

## Opportunities for Service

PATRIOTISM is not a matter of the military forces alone. Courage is displayed not only on the battlefield. The performance of duty, and only duty, is not the finished product of living. It is the giving of what you have to give that counts—giving it without expectation of any reward except that lift to the soul which affords one of the deepest of the satisfactions obtainable in this life. . . . Democracy depends upon this spirit. It should be working all the time and not merely in periods of crisis.

The efficiency of a health department depends upon this spirit, and it must be working every day of our professional lives. Positions in our health departments are not "jobs." They are opportunities for service. By giving the best that is in us, we help to make democracy worth while—something to live for, something, if need be, to die for.—*Edward S. Godfrey, Jr., M.D.* Address before the New York State Health Officers and Public Health Nurses, June 25, 1940.

# Uses of a Lauryl Sulfate Tryptose Broth for the Detection of Coliform Organisms\*

W. L. MALLMANN, PH.D., F.A.P.H.A., AND  
C. W. DARBY, D.V.M.

*Section of Bacteriology, Michigan Agricultural Experiment Station,  
East Lansing, Mich.*

AN attempt has been made to develop improved methods of procedure for the isolation of the coliform group from water, both qualitatively and quantitatively. These studies were undertaken primarily because of the fact that, seemingly in various water supplies in various parts of the United States, organisms were passing through water purification systems that caused intestinal upsets. In many instances these water supplies were meeting all bacteriological requirements of a safe water supply. In all instances the method of bacteriological analysis was based on the standard procedure of the American Public Health Association.

Coupled loosely with these epidemics were observations by a number of workers that longer incubation periods and special technic demonstrated the presence of organisms called, for want of a better term, "slow lactose fermenters."

Darby and Mallmann<sup>1</sup> showed in a laboratory study that the use of a new nutrient, tryptose, caused many so-

called "slow lactose fermenters" to produce gas in greater quantities in a shorter period of time. This was due to the fact that this substance with a few other chemical agents allowed a more rapid growth of the coliform organisms and also caused a larger number of the bacteria initially present to grow. Thus an enrichment medium is available that grows a higher percentage of the bacteria initially present in the water in a shorter period of time than the present standard lactose broth.

Many attempts have been made to introduce into the primary lactose broth tubes a selective agent which would prevent the growth of Gram-positive bacteria and thus make the primary presumptive tests more significant. In all cases where dyes have been used, such as crystal violet, brilliant green, fuchsin, and others, not only the Gram-positive bacteria are inhibited but a marked toxicity is also exhibited for the Gram-negative organisms. In using the selective agent in the primary medium many coliform bacteria are inhibited and lower colon indices result. The Standard Method Committee of the American Public Health Association has never accepted any of these for primary use for this reason.

\* Journal Article No. 490 n.s. from the Michigan Agricultural Experiment Station. Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 10, 1940.

TABLE 1

*The Bacteriostatic Titers of Surface Tension Depressants*

Compounds	Test Organisms *	Dilutions of Compounds						
		1-1T	1-5T	1-10T	1-20T	1-30T	1-40T	1-50T
Aerosol — M.A.	<i>E. coli</i>	+	+	+	+	+	+	+
	<i>Streptococcus</i>	+	+	+	+	+	+	+
	<i>S. aureus</i>	+	+	+	+	+	+	+
	<i>B. megatherium</i>	+	+	+	+	+	+	+
Nacconol N.R.S.F.	<i>E. coli</i>	+	+	+	+	+	+	+
	<i>Streptococcus</i>	—	—	—	—	—	+	+
	<i>S. aureus</i>	—	—	+	+	+	+	+
	<i>B. megatherium</i>	—	—	—	—	—	+	+
Duponol W.A. Paste	<i>E. coli</i>	+	+	+	+	+	+	+
	<i>Streptococcus</i>	—	—	—	—	—	+	+
	<i>S. aureus</i>	—	—	+	+	+	+	+
	<i>B. megatherium</i>	—	—	—	—	—	+	+
Santomerse #1	<i>E. coli</i>	+	+	+	+	+	+	+
	<i>Streptococcus</i>	—	—	+	+	+	+	+
	<i>S. aureus</i>	—	+	+	+	+	+	+
	<i>B. megatherium</i>	—	—	—	+	+	+	+
Igepon T	<i>E. coli</i>	+	+	+	+	+	+	+
	<i>Streptococcus</i>	—	+	+	+	+	+	+
	<i>S. aureus</i>	+	+	+	+	+	+	+
	<i>B. megatherium</i>	+	+	+	+	+	+	+

\* Incubation 37° C. for 48 hours

In 1938, Cowls<sup>2</sup> demonstrated that the addition of sodium lauryl sulphate to lactose broth gave a medium selective for the coliform group.

Before adopting sodium lauryl sulfate in these studies the writers tried a number of wetting agents with the object of selecting the best preparation. In Table 1 are presented a few compounds to show the selective properties of these preparations. It will be observed that Nacconol N.R.S.F. and Duponol W.A. Paste are equal in selectivity, both as to organisms and degree of action. It will also be observed that two other wetting agents, namely,

Aerosol M.A. and Igepon T. have no selective action. In Table 2 are presented the surface tensions of these compounds. The data show that the surface tension depressing action is about the same for all of these products. It is apparent that the reduction in surface tension alone is not the cause of the selective action.

To check the toxic properties, growth curves were made to determine the effects of various concentrations of the wetting agents on the rate of growth of the coliform organisms. In Table 3 are presented the bacterial counts which were obtained. The wetting agents

TABLE 2

*The Surface Tensions of Several Wetting Agents in a Tryptose Broth Base*

Compound	Surface Tension in Dynes * at the Following Dilutions							
	1-100	1-1T	1-5T	1-10T	1-20T	1-30T	1-40T	1-50T
Aerosol A.Y.	33.37	36.66	—	—	—	—	—	—
Nacconol N.R.S.F.	36.19	36.66	37.60	37.14	38.54	40.89	41.37	44.19
Duponol W.A.	33.37	39.95	39.01	39.95	39.49	42.30	43.24	47.00
Santomerse #1	36.66	36.66	—	—	—	—	—	—
Igepon T	36.66	36.66	—	—	—	—	—	—
Base Medium	55.94	—	—	—	—	—	—	—

\* Taken at 25° C. from autoclaved samples.

TABLE 3

*The Effect of Surface Tension Depressants on the Growth of Escherichia Coli in a Basic Tryptose Medium*

Compound	Concentration of Compound (Per cent)	Number of Bacteria per cc.			
		Initial	3 Hours	6 Hours	10 Hours
Nacconol N.R.S.F. 1-100	1	56	5,700	1,260,000	480,000,000
Duponol W.A. Paste 1-100	1	39	5,900	1,290,000	480,000,000
Base Medium *	—	67	15,700	10,200,000	1,280,000,000
Nacconol N.R.S.F. 1-10,000	0.01	64	24,200	5,860,000	990,000,000
Duponol W.A. Paste 1-10,000	0.01	78	29,500	15,020,000	1,040,000,000
Base Medium *	—	81	37,700	18,360,000	990,000,000
Bacto Formate Ricinoleate Broth		71	3,000	340,000	59,000,000

\* Base medium consists of Bacto-tryptose—2%; lactose—0.5%; NaCl—0.5%;  $K_2HPO_4$ —0.4%;  $KH_2PO_4$ —0.15%; pH after sterilization—6.8%

show some toxicity at concentrations of 1:100, but at concentrations of 1:10,000 no such effect is shown. These products therefore make possible the addition of a selective agent to a primary medium without the attending toxic effects on the organisms desired.

An ideal medium would appear thus to be the tryptose lactose broth plus 1:10,000 dilutions of Duponol W.A. Paste (sodium lauryl sulfate) or Nacconol N.R.F.S.

To check the value of this medium in laboratory work the Difco Laboratories kindly supplied the base broth medium. The following laboratories collaborated in these studies: Detroit Board of Health, Water Purification Plants at

Detroit, Highland Park, Wyandotte, Flint, Saginaw, and Bay City, Mich.

The same medium was used in all tests. Data were submitted to our laboratory for comparative study.

A comparison was made by testing three media in parallel, namely, standard lactose broth, lactose tryptose broth, and lauryl sulfate tryptose lactose broth. The results on tap waters for 6 plants are presented in Table 4. Using lactose broth, 238 tubes showed gas but, upon confirmation with brilliant green bile broth, only 4 tubes were confirmed. Lauryl sulfate tryptose lactose broth, on the other hand, showed gas in only 3 tubes and all of these tubes confirmed.

TABLE 4

*A Comparison of Standard Lactose Broth, Tryptose Broth and Lauryl Sulfate Tryptose Broth as Primary Media for Tap Water Samples*

Source of Samples	No. Tubes Tested	No. of Tubes Showing Gas			No. Tubes Confirmed		
		L.B.	T.B.	L.S.T.B.	L.B.	T.B.	L.S.T.B.
Flint	498	61	4	0	0	1	0
Wyandotte	240	25	4	0	0	0	0
Detroit-Springwells	126	16	2	0	0	0	0
Detroit W.W.P.	96	34	18	0	0	0	0
Saginaw	204	59	35	0	0	0	0
Bay City	384	43	5	3	4	3	3
Total	1,584	238	68	3	4	4	3

<sup>1</sup> L.B. denotes lactose broth.

<sup>2</sup> L.S.T.B. denotes lauryl sulfate tryptose broth.

TABLE 5

*A Comparison of Standard Lactose Broth and Lauryl Sulfate Tryptose Broth as Primary Media for Tap Water Samples—Highland Park, Mich.*

Period of Examination	No. of Tubes Tested	No. of Tubes Showing Gas		No. Tubes Confirmed	
		L.B. <sup>1</sup>	L.S.T.B. <sup>2</sup>	L.B.	L.S.T.B.
Mar. 6, 1939–May 28, 1939	585	59	2	0	0
May 29, 1939–Aug. 8, 1939	825	38	0	0	0
Aug. 9, 1939–Feb. 20, 1940	2,100	10	0	0	0
Total	3,510	107	2	0	0

<sup>1</sup> L.B. denotes lactose broth.

<sup>2</sup> L.S.T.B. denotes lauryl sulfate tryptose broth.

An interesting observation is the fact that only 68 tubes showed gas in tryptose broth, although no selective agent had been added. The writers are not prepared at the present time to offer any explanation of this selective action. In Table 5 are presented the data for tap water tested at the Highland Park Filtration Plant over a period of one year. These data are presented in groups to show the effect of seasonal change on the number of tubes showing gas in lactose broth that do not confirm. An examination of this table shows that of 3,510 tubes tested, 107 produced gas in lactose broth but none confirmed. In lauryl sulphate tryptose broth 2 tubes showed gas but failed to confirm. These data are very similar to the ones presented from the various laboratories in Table 4.

When comparative tests were made on polluted raw water the results were slightly different. For example, in Table 6, which shows a comparison of the tests at Flint, Saginaw, and Detroit,

it will be observed that 454 tubes showed gas in lactose broth of which only 32 failed to confirm. On the other hand, 469 tubes showed gas in lauryl sulfate tryptose broth and 43 failed to confirm. As judged by these data, it would appear that the latter medium fails to hold back organisms which are not members of the coliform groups. In all cases confirmations were made with brilliant green bile lactose broth.

Because of the failure for confirmation on tubes from raw water our study with the various plants was discontinued until further information could be obtained. In order to determine the type of organisms which were failing to be inhibited by the lauryl sulfate, Mr. Dahljelm of the Highland Park Filtration Plant kindly consented to send us tubes of lauryl sulfate tryptose broth that failed to confirm on either eosin-methylene-blue agar or brilliant green bile broth. As soon as these tubes were received at our laboratory they were plated on various media to isolate the

TABLE 6

*A Comparison of Standard Lactose Broth, Tryptose Broth and Lauryl Sulfate Tryptose Broth as Primary Media for Polluted Raw Water Samples*

Source of Sample	No. Tubes Showing Gas			No. Unconfirmed Tubes		
	L.B.	T.B.	L.S.T.B.	L.B.	T.B.	L.S.T.B.
Flint	193	211	212	3	16	20
Saginaw	98	91	91	2	1	3
Detroit-Springwells	83	85	85	21	18	17
Detroit-W.W.P.	80	83	81	6	6	3
Total	454	470	469	32	41	43

<sup>1</sup> L.B. denotes lactose broth.

<sup>2</sup> L.S.T.B. denotes lauryl sulfate tryptose broth.

organisms present. Various typical colonies were picked and transferred to suitable media for examination. In all instances where tryptose lactose broth was used we were able to isolate from these tubes members of the coliform group. In the following tables, a number of such samples are reported. In

Tables 7, 8, 9, and 10, samples which failed to confirm in lauryl sulfate tryptose broth are reported. It will be observed that in each instance members of the coliform group were isolated from tubes which failed to confirm on either brilliant green bile broth or E.M.B. agar.

TABLE 7

*A Comparison of Standard Lactose Broth and Lauryl Sulfate Tryptose Broth on Raw Water—Highland Park, Mich., July 5, 1939—9 A.M.*

Mediums	Incub. Time	Amounts of Water Tested									
		10 cc.		10 cc.		10 cc.		10 cc.		10 cc.	
		Gas	Conf.	Gas	Conf.	Gas	Conf.	Gas	Conf.	Gas	Conf.
Lact. broth	24 hr.	0		0		0		0		0	
	48 hr.	0		10	—	0		50	—	0	
L.S. Tryp. broth	24 hr.	0 <sup>1</sup>		0		0		0 <sup>2</sup>		0 <sup>3</sup>	
	48 hr.	5	—	5	+	5	+	10	—	10	—

<sup>1</sup> Aerobacter

<sup>2</sup> Aerobacter

<sup>3</sup> Aerobacter

TABLE 8

*A Comparison of Standard Lactose Broth and Lauryl Sulfate Tryptose Broth on Raw Water—Highland Park, July 7, 1939—3 P.M.*

Medium	Incub. Time	Amounts of Water Tested									
		10 cc.		10 cc.		10 cc.		10 cc.		10 cc.	
		Gas	Conf.	Gas	Conf.	Gas	Conf.	Gas	Conf.	Gas	Conf.
Lact. broth	24 hr.	0		0		0		0		0	
	48 hr.	10	—	10	—	0		30	+	0	—
L.S.T. broth	24 hr.	0		0 <sup>1</sup>		0		0 <sup>2</sup>		0 <sup>3</sup>	
	48 hr.	0		4	—	0		10	—	10	—

<sup>1</sup> Aerobacter

<sup>2</sup> Not checked

<sup>3</sup> Aerobacter

TABLE 9

*A Comparison of Standard Lactose Broth and Lauryl Sulfate Tryptose Broth on Raw Water—Highland Park, July 10, 1939—9 A.M.*

Medium	Incub. Time	Amounts of Water Tested									
		10 cc.		10 cc.		10 cc.		10 cc.		10 cc.	
		Gas	Conf.	Gas	Conf.	Gas	Conf.	Gas	Conf.	Gas	Conf.
Lact. broth	24 hr.	0		0		0		0		0	
	48 hr.	0		10	—	0		0		0	
L.S.T. broth	24 hr.	0 <sup>1</sup>		0		0 <sup>2</sup>		0		0	
	48 hr.	10	—	10	+	10	—	10	+	30	+

<sup>1</sup> Escherichia

<sup>2</sup> Aerobacter



TABLE 10

*A Comparison of Standard Lactose Broth and Lauryl Sulfate Tryptose Broth on Raw Water—Highland Park, July 7, 1939—3 P.M.*

Medium	Incub. Time	Amounts of Water Tested									
		10 cc.		10 cc.		10 cc.		10 cc.		10 cc.	
		Gas	Conf.	Gas	Conf.	Gas	Conf.	Gas	Conf.	Gas	Conf.
Lact. broth	24 hr.	0		0		0		0		0	
	48 hr.	10	—	10	—	0		30	+	0	
L.S.T. broth	24 hr.	0		0 <sup>1</sup>		0		0 <sup>2</sup>		0 <sup>3</sup>	
	48 hr.	0		5	—	0		10	—	10	—

<sup>1</sup> Aerobacter

<sup>2</sup> Not checked

<sup>3</sup> Aerobacter

These observations demonstrated that apparently the confirmatory media either caused the organisms to lose their ability to ferment lactose or inhibited these organisms from growing. It also demonstrated that in many instances tryptose broth will allow organisms to grow and produce gas that otherwise failed in lactose broth.

In order to follow through more closely the results which might be obtained from the two methods under study, a laboratory procedure was set up for checking the water samples submitted to our laboratory. Due to the amount of work necessary in the confirmations which we made it was impossible to ask any of the water purification plants to carry on this type of survey.

In each instance the sample of water was plated in parallel on standard lactose broth and lauryl sulfate tryptose broth. At the end of the 48 hour period for gas formation, E.M.B. agar plates were smeared from all tubes showing gas on both media. After the proper incubation of these plates, observations were made for the type of colony. If typical colonies were not obtained, atypical colonies were fished and planted to lactose broth and tryptose lactose broth for confirmation. If gas failed to appear in the lactose broth tubes, transfers were then made to the tryptose broth. The selected results are presented in Table 11 for lactose broth with confirmation on E.M.B. agar plates, followed by checking the

TABLE 11

*Comparative Confirmation Tests by Parallel Plantings from E.M.B. Plates to Standard Lactose Broth and Tryptose Broth*

Sample No.	Gas in 10 cc. Portion Lact. Broth					E.M.B. from Lact. Broth					Lact. Broth from E.M.B.					Trypt. Broth from E.M.B.					Trypt. broth from Lact. Broth				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
43	3	3	3	3	—	+	+	+	+	+	—	—	—	—	—	10	20	20	10	—	+	+	+	+	+
44	5	3	3	3	—	+	+	+	+	+	20	—	—	—	—	30	30	20	15	—	+	+	+	+	+
46	20	5	1	1	1	E <sup>1</sup>	+	+	+	+	—	2	—	—	—	—	30	5	—	—	+	+	+	+	+
65	1	5	5	3	5	+	+	+	+	+	—	2	2	—	—	10	10	—	5	5	+	+	+	+	+
89	3	3	3	3	3	+	+	+	+	+	—	—	—	—	—	10	20	10	5	5	+	+	+	+	+
95	60	90	40	70	90	A <sup>2</sup>	Cl. <sup>3</sup>	+	+	E	—	—	—	—	—	—	—	2	40	—	—	+	+	+	+
96	40	15	30	10	40	+	Cl.	Cl.	Cl.	Cl.	—	—	—	—	—	—	—	—	—	—	+	+	+	+	+
104	20	50	40	—	—	+	+	+	+	+	—	—	—	—	—	10	4	3	—	—	+	+	+	+	+
140	—	3	3	3	5	+	+	+	+	+	—	—	—	—	—	—	3	5	3	5	+	+	+	+	+
187	2	—	10	—	2	+	—	A	—	—	—	—	—	—	—	3	—	—	—	3	+	+	+	+	+
261	50	50	50	50	—	E	+	+	+	+	—	—	—	—	—	3	3	2	—	—	+	+	+	+	+

\* + indicates atypical colonies.

<sup>1</sup> E indicates typical *Escherichia* colonies.

<sup>2</sup> A indicates typical *Aerobacter* colonies.

<sup>3</sup> Cl. indicates presence of *Clostridia*.

TABLE 12

Comparative Confirmation Tests from Lauryl Sulfate Tryptose Broth by Parallel Plantings from E.M.B. Plates to Standard Lactose Broth and Tryptose Broth

Sample No.	Per cent Gas in 10 cc. Lact. Broth					Per cent Gas in 10 cc. L.S.T. Broth					E.M.B. from L.S.T. Broth					Lact. Broth from E.M.B.					Trypt. Broth from E.M.B.				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
43	3	3	3	3	—	5	5	5	5	5	+	+	+	+	+	—	—	—	—	3	10	10	10	10	10
44	5	3	3	3	—	5	5	—	10	5	+	+	+	+	+	10	2	—	—	2	30	30	—	25	25
46	20	5	1	1	1	5	5	5	10	5	+	+	+	+	+	—	—	—	1	2	1	—	2	2	5
65	1	5	5	3	5	10	10	40	40	—	A	+	A	E <sup>2</sup>	—	—	—	—	—	—	—	5	—	—	—
89	3	3	3	3	3	5	5	5	5	5	+	+	+	+	+	—	—	—	—	—	5	5	5	30	30
95	60	90	40	70	90	40	3	—	—	—	+	E	—	—	—	—	—	—	—	10	—	—	—	—	—
96	40	15	30	10	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
104	20	50	40	—	—	3	2	2	—	—	+	+	+	—	—	—	—	3	—	—	3	3	3	—	—
140	—	3	3	3	5	5	5	5	5	3	+	+	+	+	+	—	3	3	10	10	1	—	—	70	20
187	2	—	10	—	2	—	5	5	—	—	+	—	—	—	—	—	—	—	—	—	1	3	—	—	—
261	50	50	50	50	50	—	—	5	10	—	—	—	+	A	—	—	—	—	—	—	2	—	—	—	—

\* + indicates atypical colonies.  
<sup>1</sup> A indicates typical Aerobacter colonies.  
<sup>2</sup> E indicates typical Escherichia colonies.

colonies on lactose broth and tryptose lactose broth. It will be observed from these data that many instances have appeared wherein atypical colonies on E.M.B. agar plates obtained from lactose broth failed to produce gas in lactose broth. When transferred to tryptose broth, gas was produced in considerable quantities. Furthermore, when negative lactose broth tubes were transferred to tryptose lactose broth,

gas production was obtained. These data thus confirmed the observations made at Highland Park that E.M.B. and brilliant green bile cannot be used as confirmatory media if it is desired to obtain confirmation on all coliform organisms which appeared in lactose broth. In Table 12 are presented the results for parallel planting of the samples shown in Table 11 on lauryl sulfate tryptose broth. It will be ob-

TABLE 13

Comparative Colon Indices Obtained by Parallel Plantings by Standard Methods and Lauryl Sulfate Tryptose Broth

Sample No.	Stand. Methods		L.S.T. Broth Method		
	Gas Index	Confirmed Index	Trypt. Broth Conf.	Gas Index	Trypt. Broth Conf.
43	8	0	8	10	10
44	8	2	8	8	8
46	10	2	6	10	10
49	4	0	0	0	0
65	10	4	8	8	8
75	2	0	2	0	0
89	10	0	10	10	10
95	10	4	4	4	4
96	10	0	0	0	0
103	2	0	2	6	6
101	6	0	6	6	6
140	8	0	8	10	10
187	6	2	4	4	4
200	10	0	4	10	10
230	2	2	2	2	2
234	6	2	6	8	8
261	8	2	8	4	4
Average	7.05	1.3	5.0	5.9	5.9

served that the same picture obtained as in the case of the lactose broth, except that a higher incidence of coliform organisms was obtained. It will also be observed that gas production was not obtained in the lauryl sulfate tryptose broth when coliform organisms were not isolated by the confirmation technic used.

In Table 13 are presented comparative colon indices obtained by parallel planting by standard methods and lauryl sulfate tryptose broth. It will be observed that the gas indices obtained in standard broth are much higher than the confirmed indices obtained by confirmation through E.M.B. agar and lactose broth. Where tryptose broth confirmation was made, the colon indices obtained compare favorably with the gas indices made from the standard lactose broth. The colon indices obtained from the parallel planting in the lauryl sulfate broth by confirmation in tryptose broth were the same as the gas indices obtained in this medium.

These data show that the confirma-

tory media used at the present time in standard methods act as suppressing agents to the coliform organisms and produce a lower colon index than would be obtained if more suitable confirmatory media were used.

These data also indicate that in lauryl sulfate tryptose broth gas production could serve not only as a presumptive test but also as a confirmatory medium for routine testing. It has been our observation that, when gas is produced in lauryl sulfate tryptose broth, confirmation is always obtained. These data should be checked further in routine laboratories, but until a satisfactory confirmatory medium for checking gas production in lauryl sulfate tryptose broth is developed, the results obtained would not check with those obtained in this research.

#### REFERENCES

1. Darby, C. W., and Mallmann, W. L. Studies on Media for Coliform Organisms. *J. Am. Water Works A.*, 31:689, 1939.
2. Cows, P. B. A Modified Lactose Broth for Use in the Presumptive Test. *J. Am. Water Works A.*, 30:979, 1938.

# Secondary Attack Rates in Pneumonia

A Study of 13,500 Household Contacts \*

EDWARD S. ROGERS, M.D., F.A.P.H.A., MORTON ROBINS,  
AND MARGARET G. ARNSTEIN, R.N., F.A.P.H.A.

*Director, Bureau of Pneumonia Control; Assistant Statistician; and Consultant  
Public Health Nurse; State Department of Health, Albany, N. Y.*

IT is generally believed that pneumonia is a disease of definite but restricted communicability. There is a limited amount of published data concerned either with the prevalence and distribution of pneumococcus types in clinical pneumonia and among various population groups, or with the study of institutional or community epidemics. Multiple cases in households have been described.<sup>1</sup> The report of the "Medical Commission to investigate the causes of the increasing prevalence and fatality of acute respiratory diseases in New York City" in 1905<sup>2</sup> refers to the frequency of known previous contact with pneumonia among 1,347 hospitalized pneumonia patients and interprets these data in relation to the communicability of this disease. Gilman and Anderson,<sup>3</sup> in 1938, studied "pneumococcus infection" in an epidemic area and calculated a crude secondary attack rate for the population exposed. However, there appear to be no studies on familial or household aggregations in which the secondary attack rate has constituted the basic method of analysis.

The following study † deals with the

household aggregation of pneumonia in a sample population taken from 22 counties in New York State, as observed for varying periods between January 1, 1937, and December 31, 1939.

The selection of areas to be studied was determined largely by the adequacy of the nursing staff of the district or county health offices. The sample so obtained may be compared, with respect to certain basic characteristics, to the population from which it was drawn, namely, New York State exclusive of the cities of New York, Buffalo, Rochester, Syracuse, and the state institutions. This population is referred to subsequently as the "state in general." The sample areas are scattered well over the state, but are disproportionately rural, having 66 per cent of their population in communities of under 10,000 in contrast to 59 per cent so located in the larger group. There is close similarity between the age incidence and case fatality from pneumonia reported from both, although the pneumonia morbidity and mortality rates for the sample, during

\* Read at a Joint Session of the Health Officers and Epidemiology Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 10, 1940.

† From the Bureau of Pneumonia Control, Division of Communicable Diseases, New York State Department of Health. This study was, in part, supported by grants-in-aid from the Metropolitan Life Insurance Company and the Commonwealth Fund of New York City.

the period 1937-1939, are somewhat lower. Similarly, the general and infant mortality rates for the sample areas are slightly lower, suggesting more favorable health conditions. The morbidity and mortality experiences of the sample areas, during the 3 years of study, showed the same trends with respect to the previous 5 year experience of these areas as were observed for the state in general.

Households were admitted to the study upon receipt, at the district or county health office, of a pneumonia case report\* which indicated an index case with date of onset within the time limits of the study. As promptly as possible thereafter, the first investigation visit was made by a public health nurse who made out the household roster and obtained other identifying data for the record form. The household remained in the study until the completion of an interval of 28 days without onset of a further case. At the end of this interval, the nurse completed the record.

Thirty-nine hundred and fifty-seven index pneumonia cases were reported from the sample areas and are included in the study with the following exceptions:

Patient lived alone or in rooming house, hotel, school or institution.....	294
Patient hospitalized prior to onset of pneumonia . . . . .	179
Attending physician did not wish family visited (in 30 instances because of death of patient) . . . . .	62
Incomplete data (52 families moved from study areas) . . . . .	63
Premises found vacant or admission refused . . . . .	32
Accident or operation preceded onset of pneumonia . . . . .	28
Not investigated for other reasons.....	14
Total excluded . . . . .	672

After the above exclusions, there re-

main 3,285 index cases, each of which served to introduce a household into the study. In these households there were 13,490 individuals, exclusive of nurses temporarily in the household in a professional capacity. Each of these 13,490 individuals had a minimum contact period of 1 day or a maximum of 28 days.†

Although the term "pneumonia" as used in this study includes an unknown complement of reported pneumonias other than acute pneumococcus pneumonia, the data presented are not separable in this respect.

There were 111 secondary cases. Eighty-five households had 1 secondary case, 10 households had 2, and 2 households had 3 each.

The definition of secondary case employed requires that both the index case and the subsequent case be reported to the Department of Health as pneumonia by the attending physician.‡ The secondary attack rates given have reference to the total household aggregation of pneumonias about the index cases rather than to cases strictly secondary to them. This broader inclusion seems indicated because of the possible importance of both cases and carriers in household infection. Accordingly, 11 "multiple primary" cases with onsets on the same day as that of the index cases in the 10 households from which they came, have been included among the so-called secondary cases.

The crude secondary attack rate of 8.2 per 1,000 household contacts

† In order to simplify presentation the secondary attack rates have been calculated as direct ratios between secondary cases and contacts at risk. Because there were 524 household contacts and 111 secondary cases who either were not in the household or not exposed for the full 28 days, calculations of the rates in terms of person-days of exposure were made for several tables. However, this method did not introduce sufficient correction to justify the more elaborate procedure involved.

‡ Twenty-one cases of apparent pneumonia discovered by the investigators were excluded by this definition. Of these, 9 were the first cases in their households.

\* In New York State, pneumonia (all forms) is reportable by law.

TABLE 1

*Index Pneumonia Cases by Clinical Classification, Household Contacts, Secondary Cases and Secondary Attack Rates per 1,000 Household Contacts per 28 Days According to Age Group*

Age Group	Index Cases			Total Household Contacts	Secondary Cases	Secondary Attack Rate per 1,000 Contacts
	Broncho	Lobar	All Forms *			
Under 10	680	511	1,227	3,308	54	16.3
10-19	112	191	317	2,779	7	2.5
20-39	160	289	475	3,925	19	4.8
40-59	220	336	570	2,380	20	8.4
60 and over	381	300	696	888	11	12.4
Unknown	...	...	...	210	..	....
All ages	1,553	1,627	3,285	13,490	111	8.2

\* "All forms" includes 105 index cases of pneumonia, unspecified form.

(Table 1) is subject to variation according to the age of the contact, being highest at both extremes and tending to follow a U-shaped curve not unlike that for pneumonia morbidity. The crude rate is not materially different for urban or rural areas defined as communities

of over or under 10,000 population respectively.

The high rate found among contacts under 10 years of age cannot be attributed to the concomitant household occurrence of measles or whooping cough with complicating pneumonia,

TABLE 2

*Reported Mean Pneumonia Morbidity Rates per 1,000 Population per 28 Days, New York State \* and Secondary Attack Rates per 1,000 Household Contacts per 28 Days According to Age, 1937-1939*

Age Group	New York State *			Study Group			
	Mean Annual No. Reported Cases (1937-39)	Mean Annual Morbidity Rate per 100,000 Population †	Mean Morbidity Rate per 1,000 Population per 28 Days †	Number Household Contacts ‡	Number Secondary Cases	Secondary Attack Rate per 1,000 Contacts per 28 Days	Expected Number Secondary Cases = (4) x (5)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Under 10	3,923	527.4	0.405	3,360	54	16.1	1.361
10-19	1,242	144.8	0.111	2,823	7	2.5	0.313
20-39	2,102	145.0	0.111	3,987	19	4.8	0.443
40-59	2,675	233.3	0.179	2,418	20	8.3	0.433
60 and over	3,484	645.1	0.495	902	11	12.2	0.446
All ages	13,426	283.4	0.217	13,490	111	8.2	2.996

\* New York State exclusive of New York City, Buffalo, Rochester, Syracuse, and state institutions

† Based upon estimated population as of July 1, 1938 (4,737,649)

‡ Includes 210 contacts of unknown age which are distributed by age group

Determination of age-adjusted secondary attack rate:

$$\text{Expected incidence per 1,000 contact population} = \frac{2.996 \times 1,000}{13,490} = 0.222$$

$$\text{Age-adjustment factor applicable to secondary attack rate} = \frac{0.217}{0.222} = 0.97748$$

$$\text{Age-adjusted secondary attack rate} = 8.2 \times 0.97748 = 8.0$$

$$\text{Ratio of: } \frac{\text{age-adjusted secondary attack rate}}{\text{general morbidity rate}} = \frac{8.0}{0.217} = \frac{37}{1}$$

$$\text{Ratio of: } \frac{\text{observed secondary cases}}{\text{expected secondary cases}} = \frac{111}{2.996} = \frac{37}{1}$$

TABLE 3

*Reported Mean Pneumonia Morbidity Rates per 1,000 Population per 28 Days, New York State \* and Secondary Attack Rates per 1,000 Household Contacts per 28 Days by Month, 1937-1939*

Month †	New York State *		Study Group			
	Mean Number Reported Cases 1937-1939	Mean Morbidity Rate per 1,000 Population per 28 Days ‡	Number Household Contacts	Number Secondary Cases	Secondary Attack Rate per 1,000 Contacts per 28 Days	Expected Number Secondary Cases = (3) x (4) x Age Adjustment of Factor ***
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Jan.	1,973	0.377	2,366	21	8.9	0.915
Feb.	1,813	0.384	2,350	27	11.5	0.923
Mar.	1,853	0.354	2,086	21	10.1	0.755
Apr.	1,584	0.313	1,474	12	8.1	0.472
May	1,181	0.225	934	6	6.4	0.215
June	806	0.159	473	1	2.1**	0.077
July	510	0.098	348	2	5.8**	0.035
Aug.	389	0.074	211	2	9.5**	0.016
Sept.	430	0.085	352	0	0.0**	0.031
Oct.	725	0.138	568	3	5.3**	0.080
Nov.	873	0.172	767	6	7.8	0.135
Dec.	1,289	0.245	1,561	10	6.4	0.391
Total	13,426	0.217	13,490	111	8.2	4.043

\* New York State exclusive of New York City, Buffalo, Rochester, Syracuse and state institutions

† Month refers to month of report of cases in general population and the month of onset of the index case in study group.

‡ Monthly rates are based upon estimated mean population as of the 15th of each month, 1937-1939. Total rate is calculated upon estimated population as of July 1, 1938.

\*\* Secondary attack rate not statistically significant (rate is less than twice its own standard deviation)

\*\*\* Age-adjustment factor is 1.02304 which is the reciprocal of age-adjustment factor derived from Table 2

Determination of age and season-adjusted secondary attack rate:

$$\text{Expected incidence rate per 1,000 contacts} = \frac{4.043 \times 1,000}{13,490} = 0.299$$

$$\text{Age and season-adjustment factor applicable to secondary attack rate} = \frac{0.217}{0.299} = 0.72575$$

$$\text{Age and season-adjusted secondary attack rate} = 8.2 \times 0.72575 = 6.0$$

$$\text{Ratio of: } \frac{\text{age and season-adjusted secondary attack rate}}{\text{general morbidity rate}} = \frac{6.0}{0.217} = \frac{28}{1}$$

$$\text{Ratio of: } \frac{\text{observed secondary cases}}{\text{expected secondary cases}} = \frac{111}{4.043} = \frac{28}{1}$$

since only 3 cases of measles and no cases of whooping cough were encountered among the 54 secondary cases in this age group.

Comparison between the risk of contracting pneumonia observed among persons exposed through household contact for a maximum of 28 days, with the risk of pneumonia morbidity in the state in general for a similar period of time shows an age adjusted \* secondary attack rate of 8.0 per 1,000 contacts

for the former, in contrast to a general morbidity rate of 0.217 per 1,000 population for the latter (Table 2). The crude risk of pneumonia following exposure in an infected household is approximately 37 times the risk in the population at large. However, both the general and secondary attack rates ob-

\* The procedure used to adjust the secondary attack rate by age in Table 2 and subsequent tables is similar to that described by Raymond Pearl for "adjusted death rates (A)" in *Medical Biometry and Statistics*, Saunders, 3rd ed., 1940, pp. 270-274.

TABLE 4

## Interval Between Onset of Index Case and Secondary Case According to Clinical Classification of Index Case

Days from Onset of Index Case to Onset of Secondary Case	Clinical Classification of Index Case						Cumulative Per cent All Forms *
	Number of Secondary Cases			Per cent of Total Sec. Cases			
	Broncho	Lobar	All Forms *	Broncho	Lobar	All Forms *	
0	7	4	11	12.9	7.7	9.9	9.9
1	5	2	7	9.2	3.9	6.3	16.2
2	6	9	15	11.1	17.3	13.6	29.8
3	2	6	8	3.7	11.5	7.2	37.0
4	1	9	12	1.9	17.3	10.8	47.8
5	4	5	9	7.4	9.6	8.1	55.9
6	3	2	5	5.6	3.9	4.5	60.4
0- 6	28	37	67	51.8	71.2	60.4	60.4
7-13	15	11	26	27.8	21.2	23.4	83.8
14-20	6	2	10	11.1	3.8	9.0	92.8
21-27	5	2	8	9.3	3.8	7.2	100.0
Total	54	52	111	100.0	100.0	100.0	100.0

\* Includes 5 secondary cases in which clinical classification of index case was unspecified.

served are subject to appreciable and independent seasonal fluctuation. The contact population in the study group was disproportionately large during the months of greatest risk, whereas the distribution of the general population remained almost constant during each month. Therefore, the secondary attack rate must be adjusted for seasonal variations in the contact population at risk before proper comparison may be made between the total rates for the two groups. Such adjustment reduces the secondary attack rate from 8.0 to 6.0, and the ratio of risk from 37:1 to 28:1 (Table 3).

There is a marked concentration of risk for household contacts in the first week following the onset of the index case during which 60.4 per cent of the secondary cases occurred (Table 4). This tendency to concentration of risk in the first week appears more marked among the household contacts of lobar pneumonia than among those in contact with bronchopneumonia. Furthermore, it can be estimated that the average risk to contacts during this period is approximately 60 times the average risk in the general population.

The time distribution of secondary cases throughout the 28 days of ob-

TABLE 5

## Median Interval from Onset of Index to Secondary Case According to Age of Secondary Case and Clinical Classification of Index Case

Age of Household Contact	Number of Secondary Cases According to Clinical Classification of Index Case			Median Interval in Days from Onset of Index to Secondary Case According to Clinical Class of Index Case		
	Broncho	Lobar	All Forms *	Broncho	Lobar	All Forms *
Under 5	24	13	38	2.3	3.5	3.0
5-14	11	8	20	7.3	3.0	4.5
15-24	3	2	5	6.5	3.0	6.3
25-44	9	11	22	16.5	6.5	10.0
45-64	5	11	17	9.3	4.9	5.8
65 and over	2	6	8	5.0	5.0	5.0
Unknown	..	1 †	1	...	...	...
All ages	54	52	111	6.7	4.6	5.3

\* Includes 5 secondary cases in which clinical classification of index case was unspecified.

† Secondary case in multiple-primary households not classifiable by age.



servation shows a trailing off during the last 2 weeks. From this it may be concluded that the arbitrarily chosen observation period of 28 days has embraced the major period of risk increased to the household contacts.

The median interval between the onset of the primary case and the onset of the secondary case varies, according to the age of the contacts, in a manner opposite to the age variation of the secondary attack rate, being longest for contacts between 25 and 45 years of age and shortest for those under 5 years (Table 5). The younger contacts, therefore, appear not only to suffer a greater risk of secondary infection, but also to contract the disease more promptly following household exposure.

The secondary attack rate does not appear to be greatly influenced by the age of the index case except for the relatively high rate for contacts of index cases between the ages of 5 and 15 years (Table 6).

There is no real difference in the secondary attack rates at all ages according to the diagnosed clinical form of pneumonia of the index case. The only significant difference between secondary attack rates of those exposed to cases diagnosed as bronchopneumonia and those exposed to cases diagnosed as lobar pneumonia, is shown among contacts of index cases 25 to 44 years of age (Table 6). The very high rate for contacts of bronchopneumonia and the contrastingly low

TABLE 6

*Secondary Attack Rates per 1,000 Household Contacts According to Age and Clinical Classification of Index Case*

<i>Age of Index Case</i>	<i>Clinical Class. of Index Case</i>	<i>Number Contacts</i>	<i>Number Secondary Cases</i>	<i>Secondary Attack Rate</i>	<i>Age Adjusted Secondary Attack Rate *</i>
Under 5	Broncho	2,454	23	9.4	8.9
	Lobar	1,405	12	8.5	8.1
	All forms	3,939	35	8.9	8.4
5-14	Broncho	996	16	16.1	15.9
	Lobar	1,811	20	11.0	10.9
	All forms	2,938	37	12.6	12.4
15-24	Broncho	230	1	4.3	4.6
	Lobar	662	5	7.6	8.6
	All forms	940	7	7.4	8.4
25-44	Broncho	475	7	14.7	14.0
	Lobar	1,321	3	2.3	2.2
	All forms	1,916	11	5.7	5.5
45-64	Broncho	583	3	5.1	5.9
	Lobar	1,340	8	6.0	6.9
	All forms	1,985	12	6.0	7.0
65 and over	Broncho	924	4	4.3	4.4
	Lobar	820	3	3.7	3.6
	All forms	1,763	8	4.5	4.5
Unknown	Broncho	---	..		
	Lobar	9	1 †		
	All forms	9	1 †		
All ages	Broncho	5,662	54	9.5	9.4
	Lobar	7,368	52	7.1	7.1
	All forms **	13,490	111	8.2	

\* Adjusted to age distribution of total contact population

† Secondary case in multiple-primary household not classifiable by age of index case.

\*\* "All forms" includes 460 contacts and 5 secondary cases among household contacts of index cases of unspecified pneumonia

TABLE 7

*Secondary Attack Rates per 1,000 Household Contacts According to Clinical Classification of Index Case and by Age of Household Contact*

<i>Age of Household Contact</i>	<i>Clinical Class. of Index Case</i>	<i>Number Contacts</i>	<i>Number Secondary Cases</i>	<i>Secondary Attack Rate</i>
Under 5	Broncho	625	24	38.4
	Lobar	740	13	17.6
	All forms	1,406	38	27.0
5-14	Broncho	1,480	11	7.4
	Lobar	1,873	8	4.3
	All forms	3,490	20	5.7
15-24	Broncho	853	3	3.5
	Lobar	1,186	2	1.7
	All forms	2,102	5	2.4
25-44	Broncho	1,655	9	5.4
	Lobar	2,073	11	5.3
	All forms	3,856	22	5.7
45-64	Broncho	723	5	6.9
	Lobar	1,091	11	10.1
	All forms	1,867	17	9.1
65 and over	Broncho	232	2	8.6
	Lobar	302	6	19.9
	All forms	558	8	14.3
Unknown	Broncho	94	..	
	Lobar	103	1 *	
	All forms	211	1 *	
All ages	Broncho	5,662	54	9.5
	Lobar	7,368	52	7.1
	All forms †	13,490	111	8.2

\* Secondary case in multiple-primary household not classifiable by age

† "All forms" includes 460 contacts and 5 secondary cases among household contacts of index cases of unspecified pneumonia.

rate for those of lobar pneumonia in this group are most difficult to interpret.

When the secondary attack rates are considered according to the age of the contacts, the influence of the diagnosed

clinical form of the index case becomes more apparent. The rates are found to be uniformly higher among contacts under 25 years of age who are exposed to bronchopneumonia, than among

TABLE 8

*Secondary Attack Rates per 1,000 Household Contacts According to Age and Sex of Household Contact*

<i>Age of Household Contact</i>	<i>Number Contacts</i>			<i>Number Secondary Cases</i>			<i>Secondary Attack Rate</i>		
	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>
Under 5	687	718	1,406 *	18	19	38 *	26.2	26.5	27.0
5-14	1,810	1,680	3,490	16	4	20	8.8	2.4	5.7
15-24	978	1,124	2,102	3	2	5	3.1	1.8	2.4
25-44	1,745	2,111	3,856	6	16	22	3.4	7.6	5.7
45-64	878	988	1,867 *	10	6	17 *	11.4	6.1	9.1
65 and over	237	321	558	2	6	8	8.4	18.7	14.3
Unknown	92	119	211	1 †	..	1			
All ages	6,428	7,061	13,490	56	53	111	8.7	7.5	8.2
Age adjusted secondary attack rate **							8.7	7.5	

\* Includes one secondary case in multiple-primary household not classifiable by sex

† Secondary case in multiple-primary household not classifiable by age

\*\* Adjusted to age distribution of total contact population

those of the same age who are exposed to lobar pneumonia. The complete reverse is true for contacts over 45 years of age (Table 7). However, no special attempt was made to question, correct, or otherwise alter the clinical classification as reported by the attending physician. These data, therefore, are of value only as they relate to current terminology, and bear no established relationship to pathological or other standard basis for classification.

The secondary attack rates for all ages show practically no difference by sex, being 8.7 per 1,000 contacts for males and 7.5 for females (Table 8). The risk appears to be relatively greater for males than females between the ages of 5 and 15 years, but does not differ significantly at other ages.

The result of further analysis of the data with respect to certain of the more complex factors which also may influence the secondary attack rate, will be the subject of a future report.

Acknowledgment is made to the large group of public health nurses who obtained the initial records, as well as to the health officers who made their services available. We are particularly indebted to Dr. George H. Ramsey for the initial concept of this study as well as for valuable criticism in the preparation of the report.

#### REFERENCES

1. Tilghman, R. C., and Finland, M. Pneumococcic Infections in Families. *J. Clin. Investigation*, 15:493 (Sept.), 1936.
2. *Annual Report of the Department of Health of the City of New York*. Vol. 1, 1905.
3. Gilman, B. B., and Anderson, G. W. A Community Outbreak of Type I Pneumococcus Infection. *Am. J. Hyg.*, 28:345 (Nov.), 1938.

# Laboratory Studies of Methods for Cleansing of Eating Utensils and Evaluating Detergents\*

F. W. GILCREAS, F.A.P.H.A., AND J. E. O'BRIEN

*Division of Laboratories and Research, State Department of Health, Albany, N. Y.*

THE adequate cleansing and disinfection of eating, drinking, and cooking utensils is rapidly assuming a position of importance in the programs of health agencies and in the mind of the general public. On June 28, 1939, the Public Health Council of New York State amended the Sanitary Code, which applies to the state outside of New York City, by the addition to Chapter XIV of the following regulation for restaurant operation.

Regulation 3. Cleansing and disinfection of eating, drinking and cooking utensils. All eating, drinking and cooking utensils shall be so cleansed and disinfected as to be free from bacilli of the coliform group and to have a total bacterial count of not more than 100 per utensil as determined by test in a laboratory approved for the purpose by the state commissioner of health.

Studies were made to formulate methods for laboratory examination that could be used to determine compliance with these standards of cleanliness. A preliminary step was an investigation of cleansing procedures. As a result, it was possible to outline the basic requirements of cleansing for the

restaurant workers and to establish standard technical procedures for the approved laboratories of the state. The object of this paper is to present the results of studies undertaken for the purpose of establishing a basis for the practical evaluation of cleansing agents.

## PRELIMINARY STUDIES OF CLEANSING

Small drinking glasses were heavily contaminated with skim milk cultures of *Escherichia coli* and hemolytic streptococcus of serologic group A. These soiled articles were washed with an efficient detergent in water at a temperature from 100° to 120° F. and rinsed with clean water at 120° or over.

A swab technic similar to that recommended by the Subcommittee on Standard Methods for the Examination of Dishwashing Devices of the American Public Health Association was used to determine the extent of residual contamination.<sup>1</sup> Since it was found that both distilled water and 0.85 per cent salt solution had a destructive action on certain microorganisms, particularly streptococci, buffered dilution water prepared by adding 1.25 cc. of phosphate buffer solution to one liter of distilled water was used.<sup>†</sup>

The results of these examinations are given in Tables 1 and 2. Practically complete removal of the bacteria was secured, even when the original contaminating medium contained as high as 1,500,000 microorganisms per utensil. Subsequent sterilization by chemical

\* Read at a Joint Session of the Michigan Association of Sanitarians and the Laboratory, Engineering, and Food and Nutrition Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

† 34 grams of  $\text{KH}_2\text{PO}_4$  dissolved in 500 cc. of distilled water, pH adjusted to 7.2 with 1M NaOH and made up to one liter with distilled water.<sup>2</sup>

TABLE 1

*Experimental Study of Methods of Cleansing Glasses*  
*Total Bacterial Count per Surface Area of Rim*  
*(Test Culture, Escherichia Coli Grown in Milk;*  
*Agar Plates Incubated 48 Hours at 37° C.)*

Contaminated Controls		After Treatment		Type of Treatment
Number Tested	Median Bacterial Count	Number Tested	Median Bacterial Count	
16	13,500	16	<1	Washed at 110° F. Rinsed at 170° F. No further treatment
12	10,500	16	10	Washed at 100° F. Rinsed at 120° F. No further treatment
12	10,500	16	2	Washed at 100° F. Rinsed at 120° F. Chlorine bath, cold
4	70,000	20	<1	Washed at 100° F. Rinsed at 120° F. Ultra-violet ray cabinet, top tray, glasses upright
8	1,500,000	20	935	No washing Cold rinse Chlorine bath, cold
12	8,400	16	226	No washing No rinsing Chlorine bath, cold
4	41,000	4	75	No washing No rinsing Ultra-violet ray cabinet, top tray, glasses upright

or physical means was thus unnecessary. Disinfection of incompletely washed utensils by rinsing with chlorine water or by exposure to ultra-violet rays was not a reliable procedure.

The study of detergency has been the object of extensive investigation,<sup>3-7</sup> although emphasis has been placed on the washing of textiles and metal surfaces. Detergent action is both chemical and physical, the essential properties of a detergent being wetting, or reduction of surface tension between the surface washed and the water; deflocculation of solid particles; dispersion of solid particles; emulsification of grease; solution by chemical reaction of com-

ponents of the soil; and suppression of precipitation of insoluble substances such as calcium and magnesium soaps. Various qualitative and quantitative tests for these properties may be made, but the results in the present instance would be of little value because of the impracticability of interpreting them in terms of the efficiency of the entire compound. The most satisfactory test of a detergent is its demonstrated effectiveness in the cleansing of a soiled surface. Even such a test is of comparative value only. Detergent action is affected by the nature of the surface to be cleaned, the type of soil, the mineral character of the water—particu-

TABLE 2  
*Experimental Study of Methods of Cleansing Glasses*  
*Total Bacterial Count per Surface Area of Rim*  
*(Test Culture, Hemolytic Streptococcus, Group A, Grown in Milk;*  
*Blood Agar Plates Incubated 24 Hours at 37° C.)*

<i>Contaminated Controls</i>		<i>After Treatment</i>		<i>Type of Treatment</i>
<i>Number Tested</i>	<i>Median Bacterial Count</i>	<i>Number Tested</i>	<i>Median Bacterial Count</i>	
4	24,000	4	<1	Washed at 100° F. Rinsed at 120° F. No further treatment
4	24,000	4	<1	Washed at 100° F. Rinsed at 120° F. Ultra-violet ray cabinet, top tray, glasses upright
4	4,500	3	24	No washing No rinsing Ultra-violet ray cabinet, top tray, glasses upright
4	4,500	4	<1	No washing Cold rinse Ultra-violet ray cabinet, top tray, glasses upright

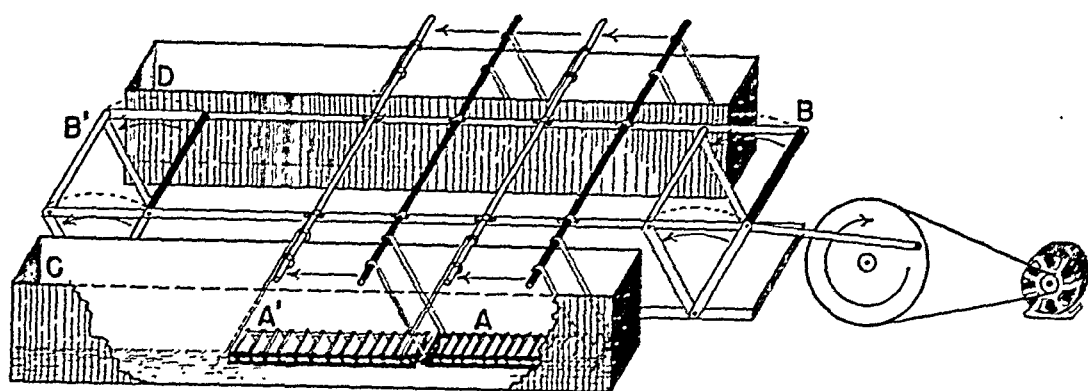
larly its hardness—and possibly by the temperature of the water. Detergent power is claimed for many compounds, the soaps being the most familiar and most frequently used, although alkalies and alkali salts of silicates and phosphates are also often employed, as well as sulfated and sulfonated alcohols, and softening agents such as the metaphosphates and other molecular dehydrated phosphates.

FUNCTIONAL TEST FOR DETERGENTS

In order to evaluate the various products marketed for dishwashing, a functional test was developed based on the simple method originally used in the studies of the removal of contaminated material from soiled drinking glasses. The technic is so standardized that the only variable is the detergent. The equipment is illustrated in Figure 1. Two metal tanks 19" by 6¾" by 8¼" deep, each resting on an electric hot plate, are used for the washing and

rinsing operations. Instead of drinking glasses, microscope slides are employed for convenience in washing a number at one time. Twelve slides are placed ½" apart at an angle of 45° in a metal rack with perforated sides, thus permitting a free flow of water around each slide. The rack is suspended from rocker arms by free-swinging rods 9½" long so that the slides are just submerged in the water which is 1¾" deep. The rocking device is operated by an electric motor at the rate of 50 oscillations per minute through a distance of 2½". There is thus sufficient agitation for complete washing or rinsing.

Since the mineral content of the water influences the efficiency of a detergent in removing soiling materials, a synthetic medium has been employed, namely, distilled water to which calcium and magnesium chlorides are added to yield calcium carbonate hardness values of 20, 100, and 300 p.p.m.,



A, A' RACK FOR SLIDES (SUBMERGED)  
 B, B' SHAKING APPARATUS  
 C WASHING TANK WITH DETERGENT  
 D RINSING TANK

FIGURE 1—Washing and rinsing device

60 per cent of which is calcium carbonate and 40 per cent magnesium carbonate.

The composition of the soil is equally important; it should be representative of material adhering to unwashed utensils and yet offer no interference with the test. A typical soil should contain oil, fat, protein, and insoluble carbohydrates, and should have sufficient adhesive quality to coat the slide with an even film not removable by agitation of water alone. After compounding and studying five different soils, two prepared according to the following formulae were selected as having the most satisfactory properties for the test.

FORMULA I (protein soil)	FORMULA II (greasy soil)
50 gm. raw egg	50 gm. peanut butter
10 " peanut butter	25 " butter
10 " lard	25 " lard
10 " butter	20 " mineral oil
10 " milk	20 " xylol

Mix egg and milk thoroughly and add other ingredients in melted state. Use formula only when freshly prepared.

Melt first three ingredients, mix thoroughly, and add mineral oil and xylol.

A measure of cleanliness more precise than that obtained by visual examination of the washed and rinsed slides is necessary. Since any residual film indicates incomplete cleansing, each of the washed slides is dusted with activated carbon so that the extent of the film is sharply defined. Excess carbon is removed by suction. The slide is then placed in a photoelectric colorimeter and the intensity of a beam of light passing through it is compared with the intensity of a beam passing through a clean slide that has been treated with carbon in the same manner. Only clear, unetched microscope slides are suitable for this test and not less than 5 clean slides for controls and 5 soiled and washed slides are used to obtain median values. The ratio of the median reading of the washed slides to that of the control slides is taken as the "cleansing index" of a detergent.

#### TECHNIC

Prepare a synthetic wash and rinse water of known hardness by adding calcium chloride and magnesium chloride to distilled water in the ratio of 6 parts of calcium hardness to 4 parts of magnesium hardness, each expressed as calcium carbonate. Add to the

wash water sufficient detergent to yield a 0.3 per cent solution.

Use for the test only clear, unetched microscope slides prepared in the following manner: Wash in hot water using soap with hard rubbing. Rinse in hot water and immerse in xylol for 4 hours. Wash in 95 per cent alcohol and dry completely by igniting. Cool and store in a clean, dry place; handle only with clean forceps.

Dust 5 slides so cleaned with activated carbon (Aqua-Nuchar No. 2) and remove excess by suspending the slide for approxi-

soiled with Formula II. Remove to the washing tank and wash for 2 minutes at 120° F. Transfer to the rinsing tank and rinse in clean water at 160° F. for 1 minute. Remove and allow to dry in a dust-free atmosphere. When completely dry, dust each slide with activated carbon and remove excess by vacuum device. Record colorimetric reading for each slide. Select the median value. The ratio of the median value of the 12 test slides to that of the 5 control slides is the "cleansing index" of the detergent under the conditions of the test.



PLATE 1—Equipment and materials used in determining "cleansing index" of detergents.

Shown are bottle of soil formula, slides suspended to dry after having been dipped in soil formula, metal rack containing washed slides, bottle of activated carbon, vacuum device for removing excess carbon, photoelectric colorimeter.

mately 30 seconds in a metal flue attached to a vacuum (see Plate 1). Using a clean slide not treated with carbon, adjust the photoelectric colorimeter (Luximeter) to a reading of 100 on the light meter. Then obtain a reading in the colorimeter for each of the 5 control slides treated with carbon. Record the readings and select the median value.

Use 12 slides to test each detergent. Dip clean slides in the soil emulsion and suspend for from 3 to 5 minutes to drain. When Formula I is used, place slides in a metal rack and dry in an oven for 3 minutes at a temperature of 110° C. Do not heat slides

Thirty-six detergents, including proprietary products and basic detergent materials frequently found in use in restaurants and similar establishments, have now been studied. The tests were made both with soil Formulae I and II. Water with a hardness value equivalent to 100 p.p.m. as calcium carbonate was used, representing the average water supply in New York State, exclusive of New York City. As



# CLEANSING INDEX OF BASIC DETERGENT MATERIALS AND PROPRIETARY DETERGENTS FOR TWO TYPES OF SOIL

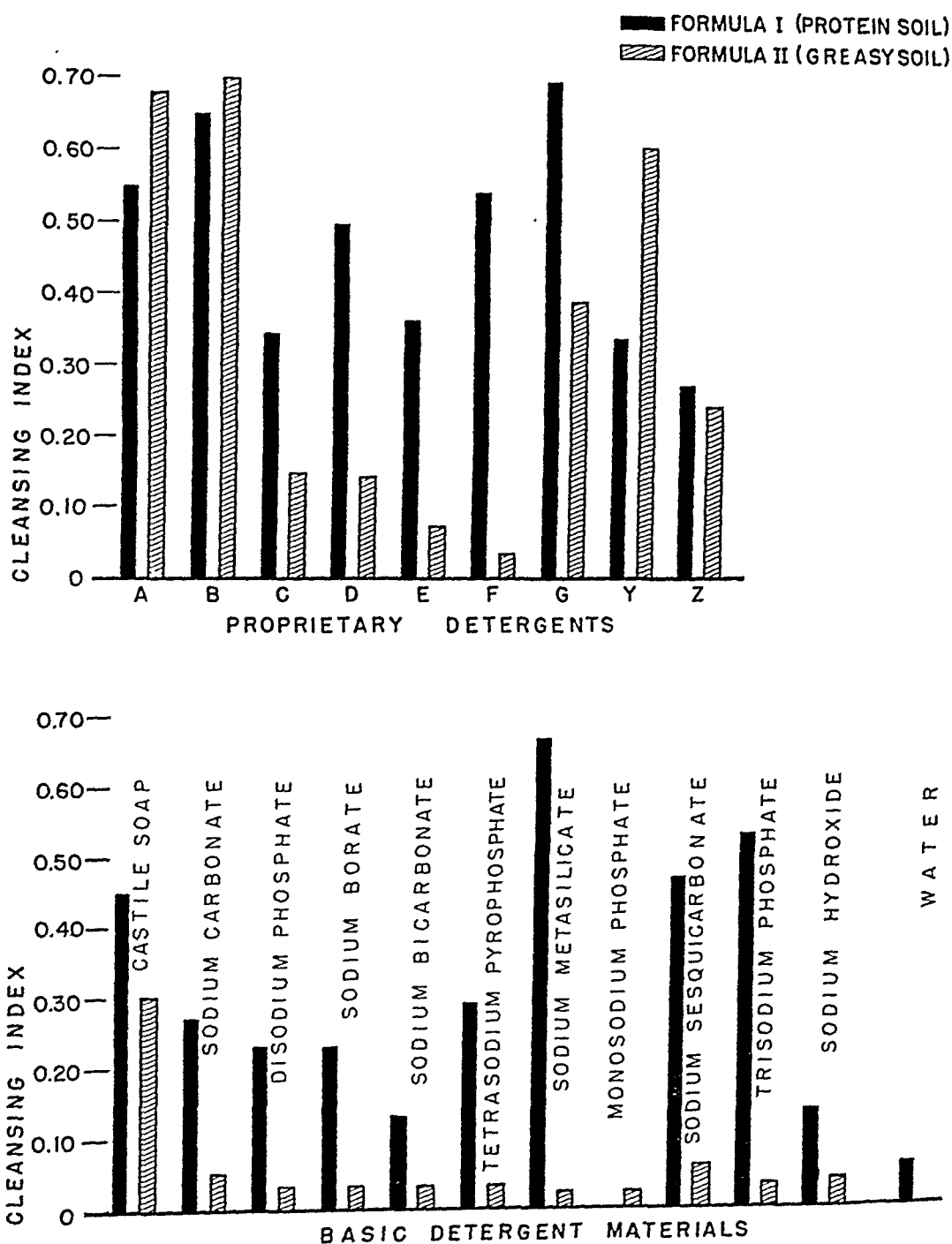


FIGURE 2—Cleansing index of basic detergent materials and proprietary detergents for two types of soil. Slides washed 2 minutes at 120° F., rinsed 1 minute at 160° F., wash and rinse waters 100 p.p.m. hardness.

a control, soiled slides were also washed in water without a detergent. Figure 2 shows the variation in efficiency of some of these commonly used products. It is interesting to note that wash water without a detergent was more effective than some of the cleansing agents.

Ten detergents from the above group, including the components of most of the common dishwashing compounds and representative proprietary products, were selected for more detailed study. Waters of 20, 100, and 300 p.p.m. hardness as calcium carbonate were used. The results are shown in Table 3 and indicate a marked difference both in the ability of these substances to remove the Formula I soil and in their effectiveness with waters of varying hardness.

Since the deposition upon a washed surface of an insoluble film resulting from interaction between a detergent and the minerals in the water is an important indication of effective washing, a test to measure film formation with multiple washing is necessary. Preliminary experiments in which unsoiled slides washed and rinsed for as many as 10 cycles in water of 100 p.p.m. hardness as calcium carbonate

suggest that there is a considerable difference in the effectiveness of various detergents in this respect also. Since the film is a deposit of mineral salts, activated carbon does not adhere sufficiently to admit of photoelectric measurement as described.

No complete investigation has been made of the effect of varying temperatures of wash water on the efficiency of any of the detergent compounds studied. However, a single experiment that corroborated the general experience indicated that temperatures higher than 120° F. had a tendency to bake the soil on the surface and to hamper efficient washing.

DISCUSSION

Detergents in which wetting and emulsifying properties predominate remove oils and fats but have a limited action on protein particles, for which deflocculating and dispersing properties are essential.

Ordinary soaps are effective when used alone in soft water and provide a desirable component of other dishwashing compounds.

The alkali phosphates and silicates have satisfactory emulsifying and de-

TABLE 3  
*Results of Experimental Cleansing of Soiled Microscope Slides with Waters of Varying Hardness*  
*Slides washed 2 minutes at 120° F.*  
*Rinsed 1 minute at 160° F.*

<i>Detergent</i>	<i>Cleansing Index</i> <i>Hardness as Calcium Carbonate</i>		
	<i>20 p.p.m</i>	<i>100 p.p.m</i>	<i>300 p.p.m.</i>
Trisodium phosphate	0.61	0.48	0.23
Anhydrous tetrasodium pyrophosphate	0.37	0.29	0.40
Sodium metasilicate	0.77	0.67	0.15
Product A	0.88	0.55	0.21
Product B	0.82	0.65	0.20
Product C	0.62	0.34	0.29
Product E	0.74	0.36	0.19
Product F	0.65	0.54	0.30
Yellow soap G	1.00	0.70	0.56
Product H	0.60	0.39	0.24
Control—water alone	0.23	0.06	0.01

flocculating properties but are not sufficiently active as wetting and dispersing agents to be used alone effectively. The alkalis in general are lacking in many of the essential detergent properties and are therefore quite ineffective by themselves. The molecular dehydrated phosphates such as sodium hexameta-phosphate are extremely active as dispersing and softening agents and in suppressing precipitation of insoluble calcium and magnesium compounds from hard waters, but otherwise have no detergent properties.

The sulfated alcohols exert marked wetting action as well as emulsifying power and therefore remove an oily soil effectively but are markedly less active toward solid and non-greasy soils.

The technic described does not differentiate between detergents intended for hand washing procedures and those for use in machines. Determinations of hydrogen-ion concentration were made on 0.3 per cent solutions of a few of the group studied, the results indicating that those with a pH value less than 10 had been designated by the manufacturers for hand washing, and those with higher values for machine washing. Detergents containing soap and sulfated alcohols are useful only for hand washing because of their excessive foaming properties.

Based on the data accumulated in these studies, an efficient detergent for cleansing of eating, drinking, and cooking utensils may be defined as a substance or compound soluble in water, which at a temperature of approximately 120° F. will provide complete removal of all types of characteristic soiling materials in a short period of

time; will produce a free-rinsing surface; will reduce to a minimum the formation of a film of precipitated mineral salts and similar substances on the washed surface; and will function effectively in waters of varying hardness.

In the application of the test outlined to a group of 36 detergents, using soil Formula I and water with a uniform hardness of 100 p.p.m. as calcium carbonate, the median value for the "cleansing index" was 0.39, and the interquartile range was 0.27 to 0.52. Detergents showing a "cleansing index" greater than 0.5 might be classified as efficient in removing this type of soil; those with an index between 0.25 and 0.5 as of limited efficiency; and those with an index of less than 0.25 as unsatisfactory.

While these experiments have demonstrated the possibility of evaluating detergent efficiency on the basis of a functional test, there is need for the adoption of a standard technic. To this end, a critical investigation of the entire problem is essential.

#### REFERENCES

1. Hitchens, A. P. Examination of Dishwashing Devices. *Seventh Annual Year Book, A.P.H.A.*, 1936-37, 45-48.
2. Butterfield, C. T. Experimental Studies of Natural Purification of Polluted Waters. VII. The Selection of a Dilution Water for Bacteriological Examinations. *Pub. Health Rep.*, 48:681-691, 1933.
3. Clayton, W. *Wetting and Detergency*. New York: Chemical Publishing Company, 1939.
4. Martin, Geoffrey. *The Modern Soap and Detergency Industry. Theory and Practice of Soap Making*, 2d ed. London: Crosby Lockwood, 1:47-50, 1931.
5. Fall, P. H. Detergent Action of Soaps. *J. Phys. Chem.*, 31:801-849, 1927.
6. Vincent, G. P. Detergent Action of Soaps. II. *J. Phys. Chem.*, 31:1281-1315, 1927.
7. Snell, F. D. Detergency of Alkaline Salt Solutions. I. Initial and Available Alkalinity. *Indust. & Engin. Chem.*, 24:76-80, 1932. II. Lowering of Interfacial Tension. *Ibid.*, 1051-1057.

# Analysis of the Present Qualifications of Public Health Nurses in the United States\*

PEARL McIVER, R.N., F.A.P.H.A.

*Senior Public Health Nursing Consultant, Division of Domestic Quarantine,  
U. S. Public Health Service, Washington, D. C.*

THE public health nursing group was one of the first professional groups to define the qualifications of its members. The first "minimum qualifications for those appointed to public health nursing positions," prepared by a joint committee of the National Organization for Public Health Nursing, the American Public Health Association, and the State and Provincial Health Authorities of North America, was published in June, 1925. Since 1925, these requirements have been revised every 5 years and the Education Committee of the National Organization for Public Health Nursing is considering a revision this year.

A review of these "minimum qualifications" as published in 1925, revised in 1930, and again in 1935, shows an interesting development. Four general types of preparation for public health nursing are defined, and while the description of personal characteristics remained about the same throughout the 15 year period, academic education, basic nursing education, and public health preparation were strength-

ened in each successive revision. For instance, in 1925, 2 years of high school was given as a minimum for academic education. In 1930 this was increased to 4 years of high school, and in 1935 additional education on a college level was recommended.

Under basic nursing education, the 1925 requirements classified as satisfactory graduation from a school of nursing connected with a general hospital having a daily average of 30 or more bed patients and offering instruction and experience in medical, surgical, pediatric, and obstetrical nursing. In 1930 the average number of bed patients in the hospital was increased to 50. In 1935 this was increased to a daily average of 100 bed patients, or a daily average of 50 patients plus an affiliation for services not obtained in the home hospital. Emphasis on the need for experience in the care of psychiatric and communicable disease patients was also included in the 1935 recommendations.

The required preparation in public health was similarly increased at each 5 year period. In 1925 a 4 months university program of study, or 1 year of public health nursing experience under nurse supervision, was accepted as

---

\* Read before the Public Health Nursing Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

satisfactory. In 1930 this had been increased to a 1 year program of study, or 2 years of experience under nurse supervision. In 1935 the public health requirement for the staff nurse working alone was given as a 1 year program of study plus 1 year of experience under adequate nurse supervision.

These "minimum qualifications" have always been goals to be attained within the next 5 year period. In the past, very limited information was available with regard to the actual professional preparation of all public health nurses. The National Organization for Public Health Nursing survey in 1934 gave this information for a fair sampling of the nurse population, but there was no complete picture. However, we went steadily forward, increasing the "minimum requirements," and many of us hoped that a large percentage of the public health nurses were meeting these requirements.

The use of Social Security funds for the training of public health personnel made it desirable to have an accurate picture of the qualifications of all public health nurses employed in this country.\* Consequently, this year in connection with the annual census of public health nursing, an attempt was made to secure information on some of the items usually included in a definition of public health nursing qualifications. This information was secured by the regional public health nursing consultants of the U. S. Public Health Service through the coöperation of the several state health departments, and is now available in mimeographed form from the Public Health Service in Washington.

As was previously stated, qualifications for public health nurses are usually defined under 4 general head-

ings: (1) academic education, (2) basic professional training, (3) public health preparation and/or experience, (4) personal characteristics. In this study, information was secured on academic education and public health preparation only. It is fully recognized that the type of basic nursing education which the nurse has had, her nursing experience, and her own personality may influence the success of her work more than academic education and public health preparation. However, experience and personal traits are not easily evaluated by objective methods. Therefore, only the two factors—academic education and public health preparation—were included in this study.

#### *Number of nurses included in study*

According to the annual census of public health nursing, 20,312 public health nurses were employed by state and local health agencies on January 1, 1940.† This number is exclusive of the industrial nurses and those nurses employed by national agencies and universities. No information was secured on the qualifications of nurses from California, but excellent returns were secured from all of the other states, the District of Columbia, and the Territories of Alaska and Hawaii. Excluding California, there were 19,117 public health nurses on duty on January 1, 1940, and data on the qualifications of 17,470, or slightly more than 90 per cent, were secured. Table 1 gives the total number who were on duty and the number and per cent for whom information on qualifications was obtained.

#### *How near are we to our present goal?*

The "minimum qualifications for

\* Only those nurses employed by health departments were included in the Public Health Service study of qualifications of health personnel, 1938.

† Complete information on the number of public health nurses who were on duty January 1, 1940, is available in mimeographed form from the U. S. Public Health Service, Washington, D. C.

TABLE 1

*Number of Public Health Nurses on Duty January 1, 1940, by Type of Employing Agency and the Percentage for Whom Information on Qualifications Was Obtained*

Type of Agency	No. on Duty Jan. 1, 1940	Information on Qualifications Was Obtained for	
		Number	Per cent of Total
All Agencies	19,117	17,470	91.3
State Agencies	825	792	96.0
Local Official			
Rural	4,134	3,960	95.8
Urban	5,038	4,595	91.2
Local Boards of Education	3,433	3,002	87.4
Nonofficial Agencies	5,687	5,121	90.5

those appointed to public health nursing positions," which in 1935 was established as the goal for 1940, included, among other items, the following specifications:

1. Graduation from an accredited high school—additional work on a college level is desirable.

2. One year of public health nursing preparation in an approved public health nursing program of study.

Of the 17,470 public health nurses included in this study, 2,652, or about 15 per cent, had not finished high school. However, 1,649, or about 9 per cent, had one or more academic degrees. This is an encouraging advance when compared with the information secured through the National Organization for Public Health Nursing survey of 1934. In that study it was found that more than 40 per cent of the staff

public health nurses had not completed high school and only 2 per cent had earned academic degrees. Table 2 gives a comparison of these figures with the information obtained in 1940 for staff nurses.

The number of public health nurses who have completed one or more years of training in an approved university course of study is gratifying also when compared to the findings of the 1934 survey, but below our expectations for 1940. Of the public health nurses now on duty, only 3,907, or about 22 per cent, had completed a year or more of training, and 6,936, or about 40 per cent, had had no special preparation in the field of public health. The National Organization for Public Health Nursing survey found that about 7 per cent of the staff (or field) nurses had completed one or more years of public

TABLE 2

*A Comparison of the Number of Staff Public Health Nurses Who Had Not Completed High School and the Number Who Had Academic Degrees in 1934\* and 1940*

	Number of Staff Nurses in Study	Less than High School Graduation		One or More Academic Degrees	
		Number	Per cent	Number	Per cent
N.O.P.H.N. Study	822	344	41.8	20	2.4
U.S.P.H.S. Study	15,805 †	2,520	15.9	1,169	7.3

\* N.O.P.H.N. Survey of Public Health Nursing, p. 65—Published by the Commonwealth Fund, New York, 1934.

† The qualifications of 1,665 supervisors are not included in this table.

TABLE 3

*Distribution of Public Health Nurses According to Geographic Area and Public Health Training \**

<i>Districts</i>	<i>Number for Whom Information Was Obtained</i>	<i>Number and Percentage of Nurses Who</i>					
		<i>Had Completed 1 or More Yrs. of University Public Health Nursing Work</i>		<i>Had Some University Public Health Work But Less than 1 Year</i>		<i>Had No University Public Health Nursing Work</i>	
		<i>Number</i>	<i>Per cent</i>	<i>Number</i>	<i>Per cent</i>	<i>Number</i>	<i>Per cent</i>
Total, all States	17,470 †	3,907	22.4	6,624	37.9	6,936	39.7
Northeastern	7,719	1,437	18.7	2,904	37.6	3,378	43.7
South-Atlantic	1,872	294	15.7	840	44.9	738	39.4
North-Central	4,606	1,208	26.2	1,838	39.9	1,560	33.9
South-Central	2,205	361	16.4	821	37.2	1,023	46.4
Western †	1,068	607	56.8	224	21.0	237	22.2

\* Industrial nurses omitted because of incomplete returns

† Exclusive of California, but includes the Territories of Alaska and Hawaii

health training and about 63 per cent had had no university preparation in the field of public health work.

Thus we have made very definite progress during the past 6 years, but we are a long way from the 1940 goal which we set for ourselves.

#### *Variations according to type of agency and geographic area*

Type of agency appears to cause less variation in the qualifications of public health nurses than does geographic location. In the Western District, which is made up of the 11 western states and the Territories of Alaska and Hawaii, 57 per cent of the public health nurses had completed one or more years of public health training in an approved university course of study. Table 3 shows the distribution according to geographic region. The North-Central District had the next highest rating with a total of 26 per cent of its public health nurses having a full year of public health training. In the Northeastern District, about 19 per cent had completed a year of training, and in the two southern districts, about 16 per cent of the nurses had a full

year of public health preparation. Almost half of the public health nurses in the South-Central District (46.4 per cent) had no public health training in an approved university course of study.

For the purpose of analysis, the agencies were grouped under the following 4 headings: (1) State Agencies; (2) Local Official Agencies; (3) Local Boards of Education; (4) Nonofficial Agencies. Local official agencies were further subdivided into rural and urban because both groups were large. Boards of education and nonofficial agencies were not separated into rural and urban because there were comparatively few rural agencies in either of these groups. From Table 4 it will be seen that 40 per cent of the public health nurses employed by state agencies had completed one or more years of public health training. This is a considerably higher percentage than prevailed among any of the other groups, probably due to the fact that the state group is heavily weighted with supervisors and consultants. About 50 per cent of the nurses employed by state agencies were classified as supervisors.

TABLE 4

*Distribution of Public Health Nurses According to Type of Agency and Public Health Nursing Preparation*

Type of Agency	Number Nurses Included in Study	Public Health Nurses Who Had			
		Completed 1 or More Years of Study in an Approved Public Health Nursing Course of Study		Had No University Preparation in Public Health	
		Number	Per cent	Number	Per cent
Total, all Agencies	17,470	3,907	22.4	6,936	39.7
State Agencies	792	320	40.4	270	34.1
Official					
Rural	3,960	1,172	29.6	1,214	30.7
Urban	4,595	659	14.1	2,303	50.1
Boards of Education	3,002	587	19.2	1,166	36.6
Nonofficial Agencies	5,121	1,169	22.8	1,983	38.7

Urban official agencies, with but 14 per cent of their staffs having a year or more of public health training, appeared to be the least well prepared.

If supervisors are excluded, the county public health nurses, or those employed by rural official agencies were found to be the best prepared. Almost 30 per cent of this group had completed one or more years of training and the group was largely made up of staff or field nurses.

When academic education is considered with relation to geographic location, it is found that the Northeastern

District had the highest percentage of nurses who had not completed high school (22.5), and the highest percentage of nurses with academic degrees (11.5). Conversely, the South-Central District had the lowest percentage of nurses who were not high school graduates (7.3 per cent), and the lowest percentage of college graduates (3.7 per cent).

A comparison of the number of nurses who had academic degrees by type of agency shows that state agencies were highest with a percentage of 17.9. Of the agencies where staff or

TABLE 5

*Distribution of Public Health Nurses According to Type of Agency and the Number with Academic Degrees*

Type of Agency	Number Nurses Included in the Study	Public Health Nurses with Academic Degrees	
		Number	Per cent
Total, all Agencies	17,470	1,649	9.4
State Agencies	792	142	17.9
Local Official			
Rural	3,960	431	10.9
Urban	4,595	182	4.0
Boards of Education	3,002	277	9.2
Nonofficial Agencies	5,121	617	12.5



field nurses predominate, the non-official agencies had the largest percentage of nurses with degrees (12.5 per cent). The urban official agencies had the lowest percentage of nurses with degrees (4.0).

### Qualifications of Supervisors

Of the 17,470 public health nurses included in this study, 1,665 were classified as supervisors, directors, or consultants, making 1 supervisor to slightly less than 10 staff nurses for the country as a whole. However, when checking the number of supervisors in a given type of agency against the number of staff nurses in that classification, it is found that the number of staff nurses per supervisor varies from a little less than 7 in the nonofficial agencies, to 47 per supervisor in the boards of education. Many of the rural health departments had no full-time local nursing supervisors but depended upon the state health department for advisory nursing service. There were 3,755 staff nurses employed by rural official agencies, and these same agencies reported 205 full-time supervisors, making an average of 18 staff nurses per supervisor if no credit is given for supervision from the

state agencies. In most states, the major part of the time of state supervisors is devoted to the rural official agencies. Therefore, it would seem fair to combine the states and rural official groups to obtain a ratio of the number of nurses per supervisor in rural areas. When such a combination is made, it will be found that there were 594 supervisors to 4,150 state and rural staff nurses, or approximately 1 supervisor or consultant to each 7 staff nurses.

From this analysis it appears that the nonofficial agencies had the lowest percentage of staff nurses per supervisor (6.9 per cent). The state and rural official agencies had about the same average (7.0 per cent). Urban health departments had an average of 1 supervisor to each 12 nurses, and boards of education had only 1 supervisor to more than 40 nurses, even when the 5 full-time state supervisors of school nursing are added to the supervisors employed by local boards of education.

On the basis of academic degrees and public health preparation of the supervisors, the state and rural supervisors appear to have had more preparation than any of the other groups, although

TABLE 6  
*Distribution of Public Health Nursing Supervisors According to Type of Agency, Public Health Preparation, and Academic Education*

Type of Agency	Number Supervisors in the Study	Supervisors Who Had Completed			
		1 or More Yrs. Study in an Approved University Course of Study		One or More Academic Degrees	
		Number	Per cent	Number	Per cent
Total, all Agencies	1,665	955	57.4	480	28.8
State Agencies	393	260	66.2	118	32.3
Local Official					
Rural	205	141	70.0	80	39.0
Urban	353	146	41.4	63	17.8
Boards of Education	63	25	39.7	14	22.2
Nonofficial Agencies	651	383	58.8	205	31.5

the supervisors in nonofficial agencies are only slightly lower. The supervisors in urban official agencies and in boards of education had about the same amount of public health preparation. Table 6 gives the distribution of supervisors according to type of agency, academic training, and public health preparation.

#### SUMMARY AND CONCLUSIONS

Public health nurses have made excellent progress in raising professional standards. However, they have not attained the 1940 goal established for themselves 5 years ago.

County nurses, or those employed by official agencies in rural areas, are the best prepared group from the standpoint of academic education and public health training. The nurses employed by official agencies in urban areas have the least preparation. The nurses in the western states have more preparation than those in any other section of the country. Oregon leads all of the states in that about 85 per cent of its public health nurses have had one or more years training. However, there are states where less than 5 per cent

have had a year of public health training.

A good staff education program is considered essential to the efficiency of any organization, and such a program is usually dependent upon a satisfactory number of qualified nursing supervisors. From the standpoint of the number and the qualifications of the supervisors, the nonofficial agencies and the rural official agencies appear to be in the lead.

While only two aspects of public health nursing preparation — general education and public health preparation—have been considered in this paper, health administrators agree that these two requirements are fundamental. Therefore it is recommended that the several state health departments keep up-to-date information on public health nursing qualifications. It is further recommended that nationwide analyses be made at least every 5 years to ascertain the relationship between the recommended standards and their attainment.\*

---

\* A loan exhibit is available from the National Organization for Public Health Nursing, 1790 Broadway, New York, N. Y., showing how personnel data may be kept up-to-date for easy periodic reviews.

# Setting up New Minimum Qualifications for Public Health Nurses\*

DOROTHY DEMING, R.N., F.A.P.H.A.

*General Director, National Organization for Public Health Nursing,  
New York, N. Y.*

AT the first meeting to organize the National Organization for Public Health Nursing, held on June 7, 1912, in Chicago, Miss Lillian Wald presented a report which, after recommending the organization of the National Organization for Public Health Nursing, stated, "The committee recommends that certain standards be upheld and recommended to all organizations employing visiting nurses." Thus, almost the first words of our sponsors, the national committees, and our members, concerned standards of appointment of public health nurses.

For some years after this, the N.O.P.H.N. membership requirements seem to have determined the standards of desirable qualifications for positions and in 1923 and 1924 there came an event which started the organization on its career of recommending minimum qualifications for appointment to positions and for the first time the statement set standards in advance of the minimum qualifications required for membership in the N.O.P.H.N. This event was the publication of two studies, *The Study of Nursing and Nursing Education in the United States*, commonly known as the Rockefeller or

Goldmarck Report, and the report of the Committee on Municipal Health Department Practices in 83 cities, of which Dr. C.-E. A. Winslow was chairman.

On re-reading the report, now 16 years old, one is impressed with the far-seeing vision of its comments and recommendations. Thus we find the statement, "It is obvious that such a calling as public health nursing demands in the first place a high degree of national capacity and, in the second, a sound and broad education." It mentions also the need for more public health nurses but points out that "the best hope lies in no shortsighted efforts to turn out large numbers quickly."† The chief weakness noted in public health nursing was lack of good clinical preparation in the fundamental education of the nurse and her lack of knowledge of teaching methods and social work. Today we continue to find these same lacks though we may use somewhat different words in describing them.‡

The report points out too that fully a quarter of the nurses whose quality

\* Read before the Public Health Nursing Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

† Excerpt from a paper by Ruth Houlton, *Not Just Any Nurse, Please*, presented at annual meeting of Pennsylvania State Organization for Public Health Nursing, October 25, 1939.

‡ See *Survey of Public Health Nursing*. Commonwealth Fund, New York, N. Y., 1934, p. 17.

of work ranked average or below in the informal classification used by the study, might have made a different showing had they not been handicapped by poor policies of management in the agencies by which they were employed. It was the Goldmarck report also that recommended that every public health nurse undertake a postgraduate program of study in public health nursing. The N.O.P.H.N. began its assistance, advice, and approval of such programs of study in the years following this important report.

A milestone in progress was passed in 1936 when the U. S. Public Health Service and the U. S. Children's Bureau accepted these basic qualifications for public health nurses appointed to positions affected by federal funds—on the state, county, and local levels. This recognition and the continued acceptance of these standards by the A.P.H.A. have greatly strengthened their position and influence.

Since 5 year revisions of our qualifications have become more or less traditional, the N.O.P.H.N. is now in the throes of revising the minimum qualifications for 1940–1945. Briefly, the machinery has been this: The Education Committee of the N.O.P.H.N. appointed a Subcommittee on Revision of Minimum Qualifications on which the following groups were represented: employers, directors of programs of study, vocational placement secretaries, the U. S. Public Health Service, the U. S. Children's Bureau, official and nonofficial agencies. Miss Leah Blaisdell is its chairman. To help the committee the N.O.P.H.N. Statistical Department sent out circular letters to representative agencies to find out how completely staff nurses employed within the last 5 years have met the present minimum qualifications—that is, those for 1935–1940. The same questions went to a few individuals in positions to know the field, and they have been

asked their opinion of the desirability of raising the standards. The placement services were also asked their impressions of the trend in qualifications, and the figures compiled by the U. S. Public Health Service on the professional preparation of nurses were scanned. Thus the thinking and suggestions from representative groups have been woven into the committee's work.

The next step, after the formulation of the standards by the subcommittee and their acceptance by the Education Committee, will be referral to the A.P.H.A. Committee on Professional Education; and eventually we hope their gradual incorporation as before into the statement of the U. S. Public Health Service, the U. S. Children's Bureau, the State and Territorial Health Officers, and their actual functioning on a state and local level in both official and nonofficial agencies.

From all of this you can see that the basis for setting up the new qualifications is more than ever before—experience. And here we come to the dilemma in which a national standard-setting body like the N.O.P.H.N. always finds itself: Shall we set a minimum standard that reflects actual practice and so be able to say that a large per cent of public health nurses meet the qualifications, or shall we push up the minimum qualifications to what we think they should be, thinking of them as goals? Usually the N.O.P.H.N. compromises, keeping near enough to actual practice to be practical, high enough to make the majority stretch toward what we think is desirable.

In the study made by the N.O.P.H.N. of the questionnaires from a cross-section of public health nurses employed for staff positions within the last 5 years in all kinds of agencies, we find that only 87 per cent were high school graduates; and only 80 per cent were graduates from accredited schools of nursing. About half of the nurses

were from schools connected with hospitals having a daily average of less than 100 patients; less than two-thirds had practice in pediatric nursing, and only 28 per cent in communicable disease during their student experience. Only one-fifth of this group had completed an approved postgraduate program of study in public health nursing covering one year.\*

On being asked how they felt about stiffening the requirements for appointment, the directors of many agencies frankly admitted they were not meeting the present standard so did not see how they could advocate raising it. Of 198 replying, 56 favored raising requirements, 11 lowering them, 73 maintaining present level, and 58 did not know. The standard most frequently mentioned as the one to be raised related to increasing the amount of postgraduate work in public health nursing.

On being asked if it was difficult to secure qualified nurses, 80 agencies said they had difficulty in securing nurses to meet requirements. Two-thirds of the state departments reported this. In both local health departments and local nonofficial agencies one-third of the reporting agencies said they had difficulty in securing nurses with the qualifications they had set up. Among 28 boards of education, 6 reported difficulties, 4 of the 6 saying their salaries were too low to attract the kind of nurse they wanted. By far the most frequent lack was the required public health nursing course, 36 of the 198 agencies saying they had difficulty in securing nurses who had the required programs of study.

One question asked: "How soon after employment would the nurse be expected to secure further preparation?" The time varied from 6 months

to 5 years. The N.O.P.H.N. has recommended for some years that nurses applying for positions who do not meet N.O.P.H.N. qualifications be given a specified period in which to qualify—the period depending somewhat on the nurse's situation. Five years at the most would seem to be a reasonable time in which to expect a young, unprepared nurse to complete this basic preparation for her job.

With these facts in mind the Committee on Revision at the present writing is not planning to raise the 1935-1940 standards greatly in 1940-1945. We have agreed that "high school graduation which meets usual university entrance requirements should be considered necessary academic preparation." Graduation from a hospital having a daily average of 100 patients was considered essential, and it was felt that such a hospital would be expected to give basic preparation in the care of men, women and children.

We felt there should be some new classifications and that new emphasis should be placed on the use of the personal interview and various types of testing applicants. Personal qualifications play an exceedingly important part in success in public health nursing. An interest in, and ability to be readily accepted by people, as well as good physical health are of utmost importance for all types of positions. It is suggested that we put more effort on improving personal interviews and the collection of credentials through scientific study of personnel methods in other fields to help us determine more accurately the personal qualities of applicants.

The last five years have also seen the growth of merit systems as a way of selecting public personnel through open competition under nonpartisan auspices. The N.O.P.H.N. plans to formulate the new qualifications, with the present

---

\* Houlton, Ruth. *Evaluating the Effectiveness of a Public Health Nursing Service—Determining the Needs of a Community*. New England Health Institute, Hartford, Conn., Apr. 15-19, 1939 (excerpts).

trend in qualifications for public health nurses employed under those systems in mind.

The new qualifications will accept 4 basic principles: (1) that the most essential requisite in public health nursing is an acceptable personality, (2) that the public health nurse must first be a competent nurse with sound basic theoretical and clinical preparation in nursing and an understanding of the social and health aspects of nursing; (3) that additional study and supervised staff experience are essential to prepare the graduate nurse for the specific functions of public health nursing; and (4) that continued in-service education is necessary to develop to the utmost the potentialities of the nurse for improved service to the family, which is the goal of all public health nursing.

Some of the questions raised by the subcommittee and by those with whom the tentative draft has been discussed are:

Should we continue to make a difference in the requirements for the nurse working alone in a rural or small town service and those for the nurse working under close supervision? I personally think we should. How much of the year's postgraduate program should be required prior to appointment (if any)? If none, then how soon should some or all of it be required? In the supervisory field should any additional theory be required? Should experience as a senior nurse or assistant supervisor be considered essential for promotion? What should be the requirements for public health nurses assuming the responsibilities of educational directors in schools of nursing? Should we require additional preparation in psychology, sociology,

education, and administration for those appointed as administrators?

How to use these standards is, of course, the most vital problem of all to the N.O.P.H.N., for like all of our efforts, the qualifications mean nothing if they are not put to use. We must also remind ourselves that the only justification for qualifications at all is performance superior to that given by an unqualified nurse. We have already expressed the hope that the U. S. Public Health Service, the U. S. Children's Bureau, the American Red Cross, state departments of health, insurance company staffs, and local groups will accept these standards as their goals. The N.O.P.H.N. is concerned also to see that these standards are clear to state boards of nurse examiners, civil service commissions, schools of nursing, and private agencies.

We all have the same steps ahead of us—to create a demand for public health nursing; to interpret the qualifications of a public health nurse; to set a standard for employment; to assist in the selection of the nurse; see that she has qualified supervision; help her meet the rising standards in her own job and qualify for a position on a higher level. It is most important that lay employers understand these requirements.

It is the earnest hope of the N.O.P.H.N. that in the next 5 years we may measure more carefully than ever before the degree to which public health nurses reach these new standards, that our recommendations for 1945-1950 may be wiser! Careful employment records will go far toward helping us gauge progress. The American Public Health Association and the National Organization for Public Health Nursing are working with you toward this end of better service.

# Health Maintenance in Small Industry\*

R. B. ROBSON, M.D.

*Walkerville, Ontario, Canada*

MANY excellent articles have appeared in the last several years concerned with absenteeism by industrial workers due to occupational and non-occupational injury, sickness, and other causes. Various estimates have also been given as to the actual time lost through these factors, which may generally be expressed as 1 day per man per year lost from occupational injury or disease, and 9 days per man per year from non-occupational injuries and sickness.

At the present time there is a tremendous effort being employed in an endeavor to carry some of the modern advances in industrial medical care to the smaller industry; namely, those industries employing 500 men or less. Herewith is presented the experience, with its attendant results, of medical service in a small industry, a malleable iron foundry, employing 200 men, with an average age of 37.8 years, mainly of foreign birth, utilizing the services of a part-time general practitioner, part-time nurse, and a very modest first aid room.

The method of operation of the Medical Department is planned with 4 main considerations in mind:

1. That the Medical Department retain its professional standing.
2. That the man be treated as an individual, human entity, with skill as his contribu-

tion to the manufacturing process, with all the hopes and ambitions of an individual, with cares and joys in his private life, just as dear and real to him as those of the manager, foreman, or stockholder.

3. That the purpose of industry is manufacturing and, as such, must conform to certain fixed laws.
4. That the efforts of the Medical Department must in no way interfere with the ethical rights of physicians in private practice.

Our results, as tabulated in the accompanying chart, reveal how successful we have been in reducing absenteeism of the employee, and the concomitant saving to the man of actual money in earnings, with a likewise increased profit to the management.

## PREEMPLOYMENT EXAMINATION

Though differing very little from standard practice, I believe our procedure bears repeating.

1. Preemployment examination is conducted in a fair, thorough, unhurried manner in the physician's private office, always bearing in mind these main points:
  - a. How will this employee fit the type of work he is engaged to perform?
  - b. What is the present state of this employee's health?
2. A record is made of any existing, yet not disqualifying disability.
3. An x-ray examination, consisting of a flat plate of the chest, is made to reveal:
  - a. Any abnormality in the heart shadow.
  - b. The presence of tuberculosis, be it active or healed.
  - c. The existence of silicosis in any of its stages.

\* Read at a Joint Session of the Industrial Hygiene and Public Health Nursing Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 10, 1940.

CHART 1

## COMPARATIVE STATEMENT, AUTO SPECIALTIES MFG. CO.

Year	Employees	Sickness- Hours Lost	Accident- Hours Lost	Hours Worked	No. Days Lost per Man, per Year Sickness	No. Days Lost per Man, per Year Accident	Cost of Medical Department
1936	223	4,656	1,248	233,077	2.6	0.7	\$1,536.57
1937	257	4,292	2,092	390,442	2.8	1.01	\$2,370.71
<i>Nurse Employed October, 1937</i>							
1938	223	1,590	764	282,573	0.89	0.42	\$2,039.24
1939	214	1,403	772	289,885	0.81	0.45	\$2,301.77

Cost of Medical Department Includes:

Salaries	Liability Insurance
Supplies	Heat
Depreciation	Repairs
Insurance	X-ray Examinations
Taxes	Miscellaneous Expense

4. All records pertaining to the examination are kept in the physician's office, notations being made on these charts, when occasion arises, of change in type of work, or absenteeism from any cause whatsoever.

## NURSE

In the event of the man being employed following his preemployment examination, the nurse visits the home of the new employee as soon as it is convenient for her to do so without interfering with more pressing duties. This visit is made, preferably at mealtime, to ascertain:

1. The economic status of the home.
2. The number of men boarding in this home, or, if the employee be a boarder, the type of home.
3. The physical accommodations.
4. The vitamin deficiencies, should the dietary regime be the same as in the old land.

Through her visit, the nurse also endeavors to persuade the wife or housekeeper that the foundry management is interested in the physical welfare of the man and his family, for the management insists that the employee's habits of work and health are reflected in foundry output. The establishment of a sincere relationship may be of great help in time of stress, the man's attitude toward the plant being influenced

in many cases by the viewpoint of the wife at home.

Once the initial visit by the nurse has been successfully handled, the idea of meddling in home affairs is lost, and it becomes apparent that subsequent visits to inquire as to the man's absence from work, to issue instructions concerning diet and special medical undertaking, receive the consideration they merit.

A record of the observations of the nurse is not kept in any stereotyped form, but in her own language, and for her own use in follow-up work in the event of sickness to the employee, and as a basis on which to plead the employee's cause before the management when necessary.

The nurse's findings are kept in her own file, not open to scrutiny of the management, and never used in time of labor strife or employer-employee difficulty.

The nurse interviews the Tuberculosis Clinic for a record of present or past infection in this employee or the other occupants of the house. Every case of tuberculosis in our city, as far as has been discovered, is recorded at the Tuberculosis Clinic and, through an efficient nursing service, records of resi-



dence are kept reasonably up-to-date. Should one of the foundry men board with a family who is under observation by the local tuberculosis board, he is tactfully shown the desirability of living elsewhere. The same procedure is followed if an employee has living with him someone who is under observation.

The great endeavor is to prevent tuberculosis rather than care for this disease once it has been discovered.

#### THE MAN AT WORK

No regular visits at stated hours daily or weekly are made by the physician to the foundry. The nurse, representing as she does the Medical Department, is free to call the physician at any time.

The nurse is present at the foundry only in the afternoons, her office in the first aid room being open always for dressings, re-dressings, and consultations.

Acting as a screen for many ailments of man or home, the nurse is perfectly free to refer the man to the foundry doctor if the ailment requires further study. She may go to the employee's home to see a sick child or wife, for of what value is the question, "How is the family?" if some means of response to the reply, "My wife was sick last night—I do not know whether to call the doctor or not," is not acted upon at once.

The nurse can readily tell if the patient should call the family doctor and, when she thinks medical care is needed, she telephones the family doctor, giving him a short history of the case. When the plant doctor is required to pass judgment on the seriousness of the ailment, he likewise personally refers the patient to the family doctor. In other words, the nurse and doctor endeavor to assist the employee in evaluating the seriousness of the illness and in obtaining prompt medical care.

#### ABSENTEEISM AND ITS CONTROL

The time card of any man absent from work is withdrawn, his name handed to the nurse. She visits his home to ascertain the cause of his absence. In case of sickness she may decide on its seriousness. In case of other reasons—sickness in other members of the family, the necessity of paying taxes, over-celebration following payday—these are tactfully handled.

As our results indicate, the number of men absent from other causes has been materially reduced since the employment of the nurse.

#### PERIODIC EXAMINATIONS

Periodic examinations are of prime importance in obtaining diagnosis of preventable diseases at an early stage, and are invaluable in controlling occupational disease, or in advising adjustment of occupation.

These periodic physical examinations are conducted yearly, or more frequently where circumstances demand, at the doctor's office in preference to the first aid room at the plant, because the man is clean, and there is all the dignity and thoroughness of a regular, unhurried consultation, free from the factory atmosphere. With the employee's records handy and adequately complete for making statistical and research studies at any time, the physician can readily tell the exact amount of time lost by the individual from any cause, sickness or injury, even plain "ball game" or drunkenness.

Moreover, if the physician is to receive full coöperation within the plant, these records should be kept reasonably private. Any employee may become very reticent about volunteering valuable information during the examination if he thinks the management free to peruse the records at any time they so desire.

An x-ray examination of the chest by an x-ray specialist is permitted, should

the original x-ray report demand further check, or should repeated colds, loss of weight, or other suspicious findings suggest such a procedure.

Repeat x-ray examination of the chest is made:

1. Where total foundry exposure is 5 years, and each subsequent 5 year period as a routine.
2. Where there is a request from the employee—and it is always wise to create both a desire for an x-ray examination and the privilege of having this examination.

#### PLANT INSPECTION

Whereas it is unnecessary for the physician to make stated visits to the plant each week, it is necessary that frequent irregular visits be made at staggered hours in order to become acquainted with different foundry practices, different occupational hazards, and to have an understanding of the different places of work by the men employed. Thereby he will become acquainted with the men and the foremen, and appreciate the meaning of "job placement."

All matters concerning the dust counts, dust control, and ventilation will be within the physician's knowledge. In this way he will always have a ready response to any particular information required by the Department of Industrial Hygiene. He is also in a position to translate the hygienic phraseology to the management and to obtain their coöperation in carrying out the recommendations.

A plant walk is made monthly with the manager in order that any scheme of betterment may be discussed on the premises and the procedure of manufacture be kept in its proper perspective.

The nurse will also make sufficient rounds of the foundry to acquaint herself with the names of the various

operations and the men performing them.

#### COST

The cost of the first aid room, part-time nurse, part-time general practitioner, x-ray examinations as outlined, is \$10 per man, per year. However, this does not include accidents, which are a separate affair, paid for directly through the Compensation Board.

An effective first aid room can be installed with a capital outlay of \$300, spread over many years.

A nurse can be employed,\* either full-time or part-time according to type of personnel, for a salary equal to her yearly income as a private duty nurse. If she has a flair for industrial work and adequate facilities are available, she can slowly and surely grasp the problems involved and become invaluable to her employers.

No manager with mounting taxes and a product to manufacture will employ any agency, such as a health service, from a purely humanitarian point of view if revenue from reduction in absenteeism is not produced, better and more efficient work realized, and a reduction in compensation costs strived for.

#### CORRELATION WITH THE MANAGER

In a plant of this size the manager knows every employee and, naturally, every manufacturing process. The nurse knows these same factors, but can also supply the home background, this being a very useful finding when periodic lay-offs occur, or actual dismissal of employees is to be considered.

The place occupied by the doctor in the organization is of great importance. Should he be placed in the same position as an ordinary employee, he will lose not only professional standing in the eyes of the workers but also the workers' respect, confidence and

---

\* See "Desirable Qualifications of Nurses Appointed to Public Health Nursing Positions in Industry." *Pub. Health Nurs.*, July, 1939, p. 410.

and have considered the method for other types whose virulence or invasiveness was not such as to produce an unduly high fatality incidence in horses. Killed culture antigens, suspensions of cells in 1 per cent potassium phosphate heated at from 52° to 54° C. for ½ hour and formalin-killed cultures suspended in 0.85 per cent salt solution and heated at 75° C. for 20 minutes, have proved effective. There is some indication that these procedures, together with preliminary desensitizing doses and the injection of the culture much diluted, reduce the incidence of shock. This is an important practical problem in the immunization of horses, but not so great a factor in the production of sera in rabbits.

Whether methods of production play any rôle in the reactions that follow the administration of serum cannot be considered definitely proved. From our experience it seems probable that the serum of horses that have been under immunization for long periods may induce more reactions than that from horses during the early stages of immunization. Although the reason for this is not entirely clear, it would appear that it may be associated with the increase in water-insoluble globulins and the accompanying difficulties in concentration.

The practical application of the production of antipneumococcus sera in rabbits was a distinct advantage in many respects. It provided an economical method for the preparation of sera of types of less frequent incidence, and made available serum for other types, notably III and XIV, satisfactory preparations of which could not be produced in horses. It is questionable whether any advantage, on the basis of equivalent protective activity, can be shown for rabbit sera as compared with horse sera. Claims for the lower cost of production of rabbit sera do not appear clearly established.

Methods of purifying and concentrating serum and also of "processing" the unconcentrated serum are especially important from several angles. Undoubtedly a reduction in reaction-inducing properties can be accomplished by these procedures. With the purified and concentrated preparations it is possible to administer adequate dosage in smaller volumes. It is important that these modifications do not reduce or impair the protective activity of the material, a point which has always been a matter of concern, and that the methods of purification remove as far as possible extraneous protein fractions which are generally assumed to be the principal factors in causing reactions. However, this assumption cannot be accepted without some reservations, since it is evident that reactions are more likely to occur with sera of certain types. The method developed by Goodner<sup>1</sup> for the processing of unconcentrated antipneumococcus rabbit serum—treatment with heat and kaolin—has been applied to unconcentrated type I horse serum, before purification and concentration. Although heating at temperatures above 56° C. caused definite loss of protective, agglutinative, and precipitative activity, no appreciable effect on the protective activity was indicated when sera were heated for 30 minutes at 56° C. or treated with kaolin. Reports on the use of sera processed in this manner are highly encouraging from the standpoint of therapeutic effectiveness and a very low incidence of chill or shock reactions.

The standardization of antipneumococcus sera by protection tests has always been a laborious and not very precise procedure. With sufficient experience and effort, reproducible results can be obtained with sera of certain types. The application of the mouse protection method, originally developed for the standardization of type I serum, to the standardization of 16 other types

of horse sera was reported before this society in 1938. The selection of suitable strains and an optimum test dose of culture were the principal requisites. Based on the criteria of regular tests and reproducible results, tests of types I, II, IV, V, VII, VIII, IX, XI, XII, XV, and XVIII sera were found relatively satisfactory and of practical value, those of sera of types VI, X, and XX less regular but of definite value. With the strains of types XIV, XIX, and XXII studied, estimation of potency by protection tests was unsatisfactory. Protection tests of rabbit sera of all types other than XIII, XVI, XIX, XXI, XXIII, XXVII, and XXX give reasonably satisfactory and reproducible results.

The practical application of the analytical methods developed by Heidelberger and his coworkers,<sup>2-4</sup> in their studies of antigen-antibody systems to the standardization of antipneumococcus sera, provides another avenue of approach to this difficult problem. Studies in our laboratories have confirmed earlier evidence of the practical value of the quantitative determination of antibody nitrogen in the standardization of antipneumococcus horse sera. These studies have, in many instances, shown close correlation between the results of the precipitation method and those of protection tests. Differences have been found in tests of sera from individual bleedings and of preparations purified by different methods which will require further investigation before their significance can be determined. In tests of several pools which comprised a large number of type I sera, the protective-unit antibody-nitrogen ratio was surprisingly constant. Definite changes in the ratio occurred when sera were heated, concentrated, or heated and concentrated. It would appear that for precise and quantitative standardization a different unit value per milligram of specific N

is required for each method of preparation. The practicability of such a procedure for general use appears questionable.

With rabbit serum the method has proved to be of distinct value in all preliminary standardization procedures. The ratio of mouse protective units to milligrams of antibody nitrogen has varied somewhat with the different types.

In studies of the complement fixing activity of rabbit antipneumococcus serum with the purified homologous type specific carbohydrate, it has been found that the time and temperature of fixation and the relative proportions of serum and antigen greatly influence the reaction obtained.

It has been practicable to produce univalent sera for all 30 Cooper types for distribution. With an increased number of types, particularly when some of them are quite closely related to those previously established, the necessity and advisability of producing separate univalent sera for all individual types will need careful consideration. There can be no doubt as to the wisdom of providing sharply specific diagnostic sera for identification of all recognized types, but when therapeutic sera of suitable potency for two or more related types can be produced in a single animal, the preparation of univalent sera for a considerably increased number of types would not seem necessary or economical.

Final judgment on the therapeutic effectiveness and indications for use of serum of the so-called higher types whose incidence is low has been delayed, if not completely blocked, by the advent of chemotherapy. Reliable statistics on an adequate number of proved cases of these types treated with homologous serum may never be obtained. This may not now be of practical significance.

The future of serum therapy in pneu-

in which periodic medical and dental examinations go hand in hand with nutritional guidance. While children are referred to this clinic from all departments of the institution, the majority are selected by the dental interns who comprise our operative staff. The occurrence of extensive caries is usually the primary reason for referral. Other indications of low physical stamina in the child, however, may lead the dentist to recommend medical and nutritional care. Interns are also encouraged to refer patients whose dental condition is excellent or good, so that the history, past and present, of these children may be studied.

The second source of patients is the Orthodontia Department, which requires medical and nutrition supervision as one of its routine procedures. The stabilizing effect of nutritional guidance on the processes of growth and development is often a significant factor in orthodontic treatment.

An increasingly large number of patients are self-referred. Regardless of the child's dental condition, parents of patients under 7 years of age receive a card describing briefly the service which the Medical and Nutrition Departments offer, and giving instructions for making an appointment. It has been found that educational work for children of this early age is more constructive and more nearly preventive in character than that with older patients.

Children from 2 to 14 years of age with widely divergent physical and dental states comprise the group of patients in the Nutrition Department. Supervision is maintained by means of periodic clinic visits, which the mothers come to regard as a preventive measure in the health care of their children.

#### EDUCATION OF THE PATIENT

Application of the fundamental principles of nutrition to the individual situation is discussed in informal per-

sonal conferences. Although emphasis is placed upon the factors that are most intimately concerned with the health of the dental tissues—namely, calcium, phosphorus, and vitamins A, C, and D—consideration is always given to dietary requirements as a whole. Effort is directed toward the correction of physical defects and the improvement of habits which influence the utilization of food. Particular attention is devoted to the promotion of adequate sleep and rest, healthful recreation, and emotional adjustment.

A painstaking survey of the patient's history and present dietary practices precedes the nutrition instruction in every case. The teaching itself must be adapted to the intelligence and interests of each parent and child and to the nationality, economic level, and environment of the family. Various devices are used to enable the mother and older patient, as well as the nutritionist, to assess the adequacy of the diet. Graphs, photographs, charts, models, leaflets, and posters become visual aids in the teaching process. Instruction proceeds step by step, with between-visit "assignments" adapted to individual capacities. The parent and child are stimulated to evaluate their own progress by their own instruments of measurement; for, like every other health educator, the nutritionist must be an opportunist, capitalizing upon the interests, attitudes, and concerns of the patient before her.

In addition to the intensive individual supervision of children registered in the nutrition clinic, a weekly class is conducted for a group of parents. The purpose of these informal talks is to bring about better understanding of problems related to the food and health habits of children.

#### EDUCATION FOR THE DENTIST AND DENTAL HYGIENIST

Effective general advice on dietary

management is often given in the operative departments of the institution by dentists and dental hygienists. In this connection, another prominent feature of the nutrition program, namely, student instruction, demands consideration.

Through the educational opportunities which are offered to its interns, the Forsyth Dental Infirmary attempts to meet in part the acknowledged need of the profession for a greater understanding of the biological aspects of dental problems. A considerable proportion of the lecture course arranged for the interns is devoted to various aspects of nutritional research. The nutritionist presents the practical application of this research in discussions of the requirements of various age groups, the construction of adequate individual and family dietaries, and useful methods of nutrition teaching in the dental practice.

Student training is a valuable by-product of the medical and nutrition clinics previously described. Each intern observes the medical examinations of a considerable number of clinic patients, and has an opportunity to study the histories and progress of children whom he has referred. These experiences foster the habit of critical observation of general physical appearance as well as of oral manifestations. As the year of internship progresses, a change of viewpoint seems reflected in the phraseology of the interns' referrals to the Nutrition Department. At first their notes state merely the extent of the carious process; later they include additional comments such as, "Child seems malnourished and underdeveloped," or on the other hand, "Patient appears alert and healthy."

Participation in the nutrition conferences of the clinic helps the intern to avoid certain misconceptions that exist among the profession. Some dentists have dismissed too lightly the matter of nutrition as applied to dental problems. When casual questioning of

the patient has failed to reveal a correlation between dietary habits and dental states, they have assumed that no such correlation exists. Other dentists have inquired as to the intake of only one or two foods or food groups, disregarding the fact that many elements are essential for good nutrition. Others have demanded too much from nutritional adjustment and have discarded all dietary instruction when expected results have failed to occur. In this case, nutrition has been considered as an exact science rather than as a series of physiological processes, each one complex.

During his experience in the Nutrition Department, the intern at the Forsyth Dental Infirmary begins to view nutrition problems in their true perspective. He discovers that a complete and accurate assessment of dietary practices demands a technic as specialized as his own. Skill in interviewing the patient he sees as the first step; care in recording and discernment in interpreting and evaluating the data become matters of equal importance. He finds that repeated contacts are necessary for a full understanding of the patient's mode of life. He learns that in the success of a nutrition conference artful pedagogy plays an indispensable rôle. He becomes aware of the fact that the outcome of nutrition instruction can never be foretold with precision.

The dentist who has thus become aware of the complexity of the problem will later find his knowledge of nutrition a helpful instrument in his practice. He will be qualified to give general nutritional suggestions; to coöperate with the physician in individual dietary adjustment; to acquaint his patients with dependable sources of nutrition information; and to make clinical observations which he will regard as indicative rather than absolute. These matters are well within his

province. If, in addition, he has developed a respect for the work of the nutrition specialist and a desire to cooperate with her as occasion arises, some of the major aims of the Nutrition Department have been realized.

The objectives of nutrition education for our second group of students, the dental hygienists, can be briefly defined. The hygienist's background in related sciences is less complete than that of the dentist. She can, nevertheless, acquire enough working knowledge of nutrition to contribute to her own physical efficiency and enjoyment of life. She should be able to direct her patients to authentic sources of nutrition information and to make general recommendations as to the character of their diets. At our institution, a course of 20 hours, periodic personal dietary conferences, and observation in the nutrition clinic are provided for the students. A dental hygienist with this degree of nutrition education needs to be well aware of the limitations of her knowledge. She should obtain further training if she is expected to assume specific responsibility in the field of nutrition.

#### COMMUNITY EDUCATION

The work thus far described is confined to the nutrition education of patients and students within the Infirmary. Following the policy of the institution as a whole, the program of the Nutrition Department has gradually developed many community activities. Especially notable is the extent to which its educational facilities are utilized by students. The department is one of the field work centers for a college course in community nutrition for home economics seniors. Students in the nutrition class of a nursery training school observe regularly in the clinic. Each year the department is visited by many additional student groups representing the professions of dentistry,

medicine, public health, nursing, hospital dietetics, and teaching.

Another phase of the community activity is the variety of contacts with members of allied professions. Successful work with patients is found to be one of the most valuable means of stimulating interest in nutrition education among these groups. The dentists and school nurses who have seen the results of nutritional guidance in individual patients whom they have referred to the department are among the most enthusiastic exponents of the nutrition service.

The nutrition staff is often requested to participate in the programs of professional organizations. The recent activities of the department, for illustration, have included talks to a dental research society, a dental health conference, an institute for school superintendents, a refresher course for dietitians, and a staff meeting for school nurses.

#### CONCLUSION

The large number of visitors to the Nutrition Department of the Forsyth Dental Infirmary signifies the interest which its program has aroused. The frequency of requests for a description of procedures indicates that this dental-nutrition work is regarded as a pattern for other community programs. It is obvious that each new venture must be individualized sufficiently to meet the demands and opportunities of the specific situation; yet certain major policies seem fundamental to the success of any program of nutrition education in the dental field:

1. The services of a nutritionist should be regarded as indispensable. A sound, far-reaching nutrition program can be developed and maintained only through a specialist who has a thorough knowledge of the science of nutrition and technical skills in utilizing and imparting that knowledge.

2. Adequate provision should be made for training the personnel in allied fields. The members of many professional groups attempt to direct the dietary practices of the public. Well rounded training in the subject of nutrition constitutes the only safe basis for the dissemination of advice.

3. Every program of dental-nutrition education should focus attention upon the maintenance of the nutritional integrity of the individual as a whole.

## REFERENCES

1. Howe, P. R. Dental Lesions: Interpretation in the Light of Recent Research. *J. Dent. Research*, 7:145 (June), 1927. Nutrition and Bone Growth. *Angle Orthodontist*, 8:209 (July), 1938.
2. Sognnaes, R. F., and White, R. L. Oral Conditions of Children in Relation to State of General Health and Habits of Life. *Am. J. Dis. Child.*, 60:283 (Aug.), 1940.
3. Howe, P. R., White, R. L., and Rabine, M. Retardation of Dental Caries in Out-Patients of a Dental Infirmary. *Am. J. Dis. Child.*, 46:1045 (Nov.), 1933.
4. Unpublished data.

## Citizens in a Democracy

WE face the probability, if not indeed the certainty, of profound changes in our way of life in America. These changes seem to be inevitable regardless of the immediate outcome of the war in Europe. They will be greatly intensified should the totalitarian governments succeed in their war of conquest and revenge. . . . We must discover and correct any existing deficiencies which may contribute to national weakness. Fundamentally any such deficiencies in this country have not depended upon any serious lack of natural resources. They exist among our human resources, our citizens of the present and of the near future. . . . Quite aside from any reference to religiosity, it has seemed to me that the spiritual aspect of our popu-

lation is the one now most in need of stepping up. We have seen the spirit overcome severe physical handicaps, we have seen it overcome the difficulties of lack of educational opportunities, of poverty and environment. I speak of this not because we health workers are primarily concerned with elevating the spiritual concepts of the people to whom we give service, though that is part of our job, but because I believe it is a primary concern of ours as individuals, as citizens of a democracy, and, above all, as servants of a democracy. —*Edward S. Godfrey, Jr., M.D., New York State Commissioner of Health.* Address before New York State Officers and Public Health Nurses, June 25, 1940.



# Possibilities for the Control of Syphilis with the Intravenous Drip Technic of Massive Arsenotherapy\*

GEORGE BAEHR, M.D., F.A.P.H.A.

*Medical Service, Mount Sinai Hospital, New York, N. Y.*

WE have failed to control syphilis during the period of thirty years since the introduction of a specific chemotherapeutic agent by Ehrlich, primarily because of limitations in the technics of its administration. During this period, 50 to 80 per cent of all infected persons discontinued therapy while still in the transmissible stage of the disease because of the necessity for repeated intravenous injections at intervals of 5 to 7 days for a year or longer. Those who patiently continue treatment remain at large, capable of communicating their disease to others for weeks or months after therapy is initiated.

Massive arsenotherapy as originally conceived by Ehrlich has been tried repeatedly in the hope of shortening the period of communicability of the disease and of accomplishing a cure without the necessity for the discouragingly prolonged intermittent treatment. These attempts have thus far been unsuccessful due to the toxicity of the arsenicals when administered rapidly and in large amounts. The continuous intravenous drip technic introduced recently by Drs. Chargin, Hyman, and Leifer on

my service at the Mount Sinai Hospital, New York, eliminates most of the toxicological hazards and presents the possibility of controlling the communicability of the disease in most cases within 5 days. For the great majority of infected persons who come under treatment while still in the primary or the early secondary stage of the disease, the one 5 day course of treatment is adequate to accomplish complete fading out of the Wassermann reaction and permanent elimination of all clinical manifestations.

The recent publication of a symposium on this subject<sup>1</sup> makes it unnecessary to recite the details. The technic consists essentially in the administration of the arsenical in 5 per cent glucose solution by means of a slow continuous intravenous drip at the rate of 30 drops a minute. The intravenous drip is continued for 10 to 12 hours a day on 5 successive days. By this means, 4.0 to 4.5 gm. of neoarsphenamine, or up to 1.2 gm. of arsenoxide (mapharsen), are administered in 5 days. No other therapy is given. Altogether, 386 patients in the primary or early secondary stage of syphilis were treated, 111 with neoarsphenamine and 275 with arsenoxide (mapharsen).

Of the first series of 25 patients treated with neoarsphenamine more than

\* Read before the Health Officers Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 18, 1940.

7 years ago, 15 are still under observation. In 13 the treatment may be considered entirely satisfactory, the blood and spinal fluid being serologically negative and the patients remaining well. One of these men became reinfected 3 years and 2 months later; he developed a new chancre at a different site on the penis after the customary incubation period following reëxposure to an infected contact. The blood Wassermann was still negative; by dark-field, spirochetes were demonstrated in the new primary lesion. No treatment was administered until the Wassermann had been observed to become 4 plus and until the typical rash and other secondary manifestations of the disease had appeared. There can therefore be no question that this represented a reinfection in a previously cured person. A similar reinfection occurred in another man after he had been well and serologically negative for 1 year and 8 months. The fifteenth patient remained well and serologically negative, except that he was reported at another hospital to have had a 2 plus Wassermann 2 years after treatment. This finding could not be confirmed by us before or since that time. If these last two instances are regarded as possible failures, the satisfactory therapeutic results exceeded 90 per cent.

Under the supervision of a distinguished committee, a second series of 86 patients with early syphilis were treated similarly with neoarsphenamine. The committee included the heads of the departments of pharmacology and of internal medicine at Columbia University, the head of the Department of Internal Medicine at Cornell Medical School, the Commissioner of Health of the City of New York and the head of the City's Bureau of Social Hygiene, a representative of the U. S. Public Health Service, the medical director of the American Social Hygiene Association, and several other experienced

syphilologists and internists. Patients selected by the Health Department were treated by Drs. Hyman, Chargin, and Leifer on my service at the Mount Sinai Hospital, and on discharge the responsibility for follow-up and interpretation of the results was assigned alternately to Dr. Bruce Webster at New York Hospital and to Dr. Evan Thomas at Bellevue Hospital. At every follow-up visit blood was drawn for Wassermann and flocculation tests and duplicate samples were sent to Dr. John Mahoney of the U. S. Public Health Service and to John Koopman of the City Health Department, as well as to the laboratory of the respective hospitals. In this manner every sample of blood (and later of spinal fluid) was examined independently in three different laboratories, Dr. Mahoney and Mr. Koopman doing quantitative titrations independently.

The therapeutic results were identical with those of the first neoarsphenamine series. Of the 86 patients, 7 disappeared shortly after the treatment and 1 died. In the remaining 78 who have been followed for 2 to 2½ years, the results have been satisfactory in 71 patients, or 91 per cent. Five per cent are therapeutic failures and in 4 per cent the result is doubtful.

The toxic effects of neoarsphenamine, especially the frequent occurrence of transitory sensory disturbances (polyneuritis), and a death from hemorrhagic encephalitis persuaded the supervising committee to substitute arsenoxide (mapharsen) for neoarsphenamine. In a first series of 157 patients treated with mapharsen, the dose was experimental, 400 mg. to 1,000 mg. being administered in 5 days. Although the dosage in this series proved to be inadequate, unequivocally satisfactory results were obtained in about 80 per cent. Seventeen per cent are serological or clinical failures and the result in 4 per cent is doubtful. Most of the

failures responded satisfactorily to a second 5 day course of treatment with 1,200 mg.

In a more recent series of 125 patients with early syphilis treated with 1,200 mg. of mapharsen in 5 days, the results appear to be definitely better than in the series treated with the smaller doses. In 76 per cent the results are already satisfactory, both serologically and clinically; another 20 patients or 19 per cent, are well and in most of them the Wassermann titer is fading off but has not yet had time to reach complete negativity. From observations on the two older series, the prediction seems warranted that the majority of these patients with fading complement-fixations will soon fall into the satisfactory group, and that the final percentage can be expected to approximate that of the neoarsphenamine series.

A most important observation made both in the neoarsphenamine and the mapharsen series is that fewer failures were encountered in persons in whom the treatment was begun within 8 weeks after the appearance of the primary sore. This observation is especially significant for the military or naval services, as well as for men in industrial plants where medical care is available, especially if no disciplinary action is taken which might dissuade infected persons from reporting promptly for treatment. The majority of soldiers and sailors who develop fresh syphilitic infections come under observation soon after the appearance of the primary sore, a stage of the disease when in the great majority of instances, the 5 day treatment is in our experience adequate to assure prompt elimination of the infection and a clinical result as satisfactory as can be accomplished by 2 years of intermittent treatment.

In the mapharsen series, most of the toxic phenomena ordinarily observed in patients treated with neoarsphenamine

were absent or clinically insignificant. Not an instance of so-called histamine, anaphylactoid or colloidoclastic shock was observed. Primary fevers, which occurred after the first day of treatment with neoarsphenamine in 62 per cent of the patients, followed the first day of treatment with mapharsen in 41 per cent and were milder. Secondary fevers, which occurred in 64 per cent of the neoarsphenamine cases, fell to 12 per cent with mapharsen, usually after conclusion of treatment with the appearance of a toxicoderma. Toxicoderma was seen in only 11 per cent of the patients, although it had occurred in 45 per cent of those who received neoarsphenamine.

Among the entire group of 283 patients treated with mapharsen no renal damage, no blood dyscrasias, and no instance of dermatitis exfoliativa was observed. There was also no significant liver damage, a slight transient icterus occurring in 2 patients, 0.7 per cent. Puerperal neuritis, which had been mild in 25 per cent of the neoarsphenamine patients and severe in 10 per cent, was rarely observed with mapharsen. Mild, transient paresthesia without any objective findings was detected by inquiry in only 5 out of the 283 patients, or 1.7 per cent. There were no therapeutic fatalities, although 1 patient developed frank symptoms of hemorrhagic encephalitis, 1 patient had a single convulsion while under observation, but was otherwise well and 1 patient had a brief period of transient mental confusion.

Although the clinical results in the primary and early secondary stages of syphilis are encouraging, general employment of this therapeutic technic must be postponed until there is a wider toxicological experience with the method in the hands of a large number of independent observers in well organized treatment centers throughout the country. Many such institutions in various

parts of the country are now accumulating this experience, some of them with encouragement and assistance from the U. S. Public Health Service and their state and local health departments. As control of the venereal diseases is an important part of our national defense, it is most important that these widely distributed experiences be correlated and interpreted by a central agency as rapidly as they accumulate. It would be helpful if a national committee were appointed, comprised of those syphilologists and internists who have been accumulating the largest experience with this technic, and that this committee proceed to gather the combined experience of the country on toxicology as well as on therapeutic effectiveness.\*

The public health importance of this rapid form of therapy may be summarized as follows:

1. Highly infectious persons are out of circulation until treatment is completed.
2. Upon discharge from the hospital 7 or 8 days after admission, the danger of transmitting infection to others has been eliminated or reduced to a minimum.
3. Even though a patient may disappear from observation after leaving the hospital, a satisfactory result requiring no further treatment can be assumed to have been achieved in at least 80 per cent.
4. Only 10 to 20 per cent of the patients

who receive a single 5 day course of intravenous drip therapy may remain a possible hazard to the community if never seen again, compared with the 50 to 80 per cent of infected persons who begin treatment with the customary intermittent technic but do not follow through.

5. The short period of hospitalization has an important educational value, which facilitates successful follow-up. Another aid in this direction is the fact that the great majority of the patients who are to be followed need be subjected to no more treatment of any kind.

6. The total treatment cost per patient is less than that of the present prolonged methods.

7. The method is probably three times as effective in controlling the spread of the disease.

If the 5 day intravenous drip technic should prove on extended trial to be no more hazardous than the present technic, public health officers may be justified in applying the rules which they already employ for the control of other communicable diseases. Beds are lying idle during large parts of the year in communicable disease hospitals and in isolation units of general hospitals. As the period of hospitalization averages 8 days, the rapid turnover makes the beds promptly available if they are required for other communicable diseases. No better use can be made of vacant hospital beds than for the prompt control of the highly communicable stage of syphilis.

#### REFERENCE

1. Hyman, Harold Thomas, Chargin, Louis, Leifer, William, and Rice, John, *et al.* *Arch. Dermat. & Syph.*, 42:239-284 (Aug.), 1940.

\* Since this paper was read, Surgeon General Parran has appointed a committee for this purpose, which will be expected to report its findings before the Section on Dermatology and Syphilis at the meeting of the American Medical Association in June, 1941.

# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

February, 1941

Number 2

H. S. MUSTARD, M.D., *Editor*

MAZŮCK P. RAVENEL, M.D., *Editor Emeritus*

LEONA BAUMGARTNEP, M.D., *Associate Editor*

ARTHUR P. MILLER, C.E., *Associate Editor*

AUGUSTA JAY, *Editorial Associate*

## *Editorial Board*

RIGINALD M. ATWATER, M.D.

*Chairman, and Managing Editor*

IRA V. HISCOCK, Sc.D.

KENNETH F. MAXCY, M.D.

HENRY E. MELENEY, M.D.

## INFLUENZA: FROM COMPLETE IGNORANCE TO A PARTIAL KNOWLEDGE

AT the Sixty-ninth Annual Meeting of the American Public Health Association, Dr. F. S. Horsfall, Jr., summarized the existing knowledge of influenza. His paper was published in the November issue of the *Journal*, which went to press in October. In presenting this summary, Dr. Horsfall rendered an important and necessary service to public health and the medical profession. Among other things, he made it clear that influenza, as it occurs from time to time, is not necessarily due to a single etiological agent; that a diagnosis as to what type of influenza infection is causing the more or less classical picture in a given instance cannot be established clinically. He referred to the fact that, as a result of research in England and this country in the past decade, one specific virus has been isolated, and by the use of neutralization tests it may be determined whether the etiological agent in a particular case is this specific virus or not. Further, Dr. Horsfall reported that in a new and orderly scheme of nomenclature, agreed upon by workers at the laboratories of the International Health Division of the Rockefeller Foundation and the National Institute for Medical Research in London, this etiological agent is now known as "influenza A virus." If other influenza viruses are isolated the nomenclature scheme provides that they may be called influenza B virus, C virus, etc.

Regarding influenza A virus, Dr. Horsfall in his summary makes the following reserved and sound statement: "Although there can be almost no reasonable basis on which to doubt the evidence that this virus has caused many epidemics of influenza in the last 7 years, there is equally good evidence that this virus has not caused all epidemics of the disease during the same period."

All through this period of investigation, research workers in influenza have been exhibiting a most commendable degree of foresightedness in that, in the clearly-cut epidemics presenting the clinical characteristics of influenza, they have obtained throat washings from patients and, as a rule, have been successful in getting sera from a number of patients early in illness and in convalescence. The throat washings have been introduced into ferrets in an effort to establish and

isolate whatever virus might be causing the outbreak. The sera have been tested against influenza A virus, and in some instances the results indicate that the epidemic in question was caused by this virus. In others the convalescent serum appeared to possess no ability to neutralize influenza A virus. No whit discouraged, influenza workers put such influenza A negative sera aside and hoped for new knowledge. Now this new knowledge has come. It was brought to light by Dr. Thomas Francis and was reported in the November 1 issue of *Science*.

Francis has long been one of the outstanding research workers in the laboratory and epidemiological aspects of influenza. He has been investigating epidemics, gathering throat washings, cross checking sera and influenza A virus, and storing sera from different outbreaks. In the early part of 1940, he investigated an outbreak of acute respiratory disease at Irvington House, Irvington-on-the-Hudson, N. Y., a home for convalescent children. With throat washings he was able to inoculate ferrets successfully and to recover a virus. This virus, however, did not neutralize sera previously obtained from influenza A cases. He then checked this virus against serum obtained from patients at Irvington House. In general he found that, while serum taken from these patients early in their illness did not neutralize the new virus, convalescent serum from these same patients did neutralize the new virus.

Francis then checked this new virus against sera obtained in previous epidemics. Those sera which had neutralized the influenza A virus did not neutralize the new virus, but sera from an early 1940 outbreak in North Carolina and from a widespread epidemic of acute respiratory disease in 1936, both of which had failed to neutralize the influenza A virus, did neutralize this newly isolated virus.

Of his procedures and of this virus, Francis's summarization in part is as follows: "The immunological evidence indicates clearly that the newly isolated virus is the cause of the epidemics of acute respiratory disease in Irvington and North Carolina in 1940 and of the extensive epidemic early in 1936. These epidemics have presented no outstanding clinical features to differentiate them from the outbreaks which have yielded the virus of epidemic influenza (influenza A virus) . . ." Francis, in conformity with the new nomenclature mentioned above, will designate this new virus "influenza B virus."

This progress is encouraging to anyone who remembers the influenza pandemic of 1918. Public health workers who are fortunate in being too young for such recollections will find it interesting and profitable to go to their public libraries and study the newspaper files of the period in question. The press gives a much more colorful picture of that catastrophe than can any statistical table, for from these newspaper accounts one gets the sense of unpreparedness, of community confusion, of emergency action—and of endless funeral processions. That pandemic gained explosiveness during a war period. Just what part conditions of war play in precipitating an epidemic, no one may safely say, but past experience indicates that cantonments and prison camps, large scale troop movement, and dislocated civilian populations tend to break down isolations, perhaps resistance, and possibly contribute in some way not completely understood to an increased virulence of certain bacteria and viruses. The work of Shope, concerned with the symbiotic, immunologic, and epidemiologic relationships of *Hemophilus influenzae suis* and the virus of swine influenza, and his research in connection with shock as a factor contributing to or precipitating an influenza-like attack in swine in which the virus is latent, may throw important light upon certain aspects of this problem.

The world today faces most of the conditions with which the last devastating pandemic of influenza was associated. No one knows whether or not the experience of 1918 will be repeated in 1941. No one knows whether the etiological agent in the past epidemic was influenza A virus or influenza B virus, or some other. A vaccine against influenza A is now undergoing field trial. No vaccine has yet been reported for influenza B. We may only hope for further knowledge in the development of vaccines against epidemic influenza of whatever type, as it is from this direction that prevention and control of the disease must come. Ordinary measures of isolation and personal hygiene seem not to stem the tide of an influenza epidemic.

### MUNICIPAL PUBLIC HEALTH ENGINEERING—AN URGENT SITUATION

THE American Public Health Association is officially on record for the opinion that there is a notable lack in the employment of qualified public health engineers dealing with municipal environmental sanitation. Two years ago it was pointed out that only one-quarter of the cities with populations of 50,000 or more employed public health engineers, and that even in the 37 largest cities with populations of more than 250,000, but 14 had public health engineers in their departments.

A report to the Engineering Section at the Detroit meeting bearing on this acute shortage stated that the defense program which the United States is now undertaking is already bringing a multitude of environmental health problems to the front, such as the increased use of community sanitary facilities, water supplies, sewage disposal, garbage disposal, etc., as involved in the development of military camps or new and enlarged industrial plants. New and greater problems too, connected with housing, room occupancy, insect control, food control, and industrial hygiene need to be given the timely attention of municipal health departments. The experience of cities located near great industrial operations or Army cantonments during the last war conclusively showed that engineers functioning as local municipal health engineers were of incalculable value in providing health safeguards for the Army camps, industrial plants, and the normal local population.

Appreciating the urgency of this situation, the Engineering Section of the Association has proposed that an early conference be called either by the U. S. Public Health Service or by the U. S. Conference of Mayors, on municipal sanitation as related to the current emergency. The promotion of a balanced local health department organization will require significant expansion of personnel in environmental sanitation. Specifically it is suggested that municipal health departments be considered to have a very important claim on federal funds appropriated for local and state health work, with special reference to municipal sanitation.

Federal, state, and city health officials must exhibit an active and continuing interest in municipal engineering service if these departments are to discharge fully their proper responsibilities in protecting and improving the public health, especially in the current emergency.

## THE JARGON MAY GET US IF WE DON'T WATCH OUT

NEARLY everyone knows the predicament of the man who caught the bear by the tail: there was serious uncertainty as to whether he had the bear or the bear had him. A somewhat similar problem is presented in the terminology employed in a number of the sciences and near sciences related to public health. Thus, some years ago the helminthologists took a tail-grip on "worm burden," and for a while one wondered if the patient had the burden, or the worms had the patient, or if possibly the worm burden had the helminthologists. Their use of this phrase, however, does not constitute a major semantic sin: they were tempted by the blandishments of a catch phrase and they fell, but helminthologists are, after all, pretty robust scientists and we need not worry much about them.

A more serious situation is created by the etymological expeditions of the hardy prospectors who find themselves in the swamps and forests surrounding the established settlements of public health. From the enthusiasm of these pioneers one gains an impression that they have discovered a promised land, and this may be true. Unfortunately, however, they seem to have decided that as a matter of strategy they must establish vocabulary frontiers and diction blockhouses so remote from settled language usage that savages from the hinterland of lay affairs and the effete plodders of conventional public health work may never hope to invade the new domain.

Recently we picked up a paper from one of these Shangri-Las of public health. The opening sentence gave promise that the essayist would get right down to cases and make a forthright and understandable statement. Soon, however, that author grabbed the word "technic" by the tail and from then on it was anybody's fight. For our own part, we were conscious of the same urge to kill that arises when one's hostess fails to restrain her child from demanding too much attention for his new parlor trick. On further reading of the paper, however, this irritation gave place to amazement, for nouns began to take on the functions of verbs and then "learning processes," "skills," "attitudes," "situations," "levels," and "challenges" began to "motivate," "implement," "integrate," "coördinate," and "enrich" "patterns" of "culture" and "philosophy"—or vice versa.

We put that paper down with a feeling that we were losing our grip, that we had failed to keep up with the newer things, that the old and heretofore secret feeling of inadequacy was coming shamefully to light. We felt that without quibbling we must make a decision as to whether we understood this thing or not. Finally, and reluctantly, we admitted that we didn't know what the deuce the author was driving at. This admission gave rise to a new courage, and we wondered if perhaps in the tussle between the bear and the author the outcome was not a victory for the bear.

There is, of course, a place for technical terms, and in writing or speaking it is desirable to choose expressions that give just the shade of meaning one wishes to convey. But this nicety of selection is quite a different thing from the too heavy burdens and the too long hours of work that some impose upon defenseless words and phrases. Maybe we need word-burden legislation or a Society for the Prevention of Cruelty to Phrases. Otherwise, the jargon is going to get us if we don't watch out.



# Credit Lines

## A Selective Digest of Diversified Health Interests

D. B. ARMSTRONG, M.D., AND JOHN LENTZ, M.S.

### FOR YOUR RADIO PROGRAMS

The broadcasting of health information is now a special feature that many of the nation's radio stations present regularly for their listeners. For a long time after radio made its appearance upon the American scene, health broadcasts were limited almost entirely to lectures given by well known medical and public health authorities. The information presented was reliable and worth while, but all too often the manner of presentation left much to be desired. Radio experts, however, were helpful in suggesting ways to remedy the situation. Today we are beginning to have health programs that are written by expert script writers in collaboration with medical authorities, enacted by professional casts, and dramatized with sound effects and music. In short, some good health education material is now on the air, and the "Keeping Well Radio Health Dramas" of the Baltimore City Health Department are an outstanding example of the improved work that is being done in this field.

The Baltimore City Health Department has published its "Keeping Well Series" in two volumes. The scripts are copyrighted but are now available for the use of other health agencies. About twenty dramas are printed in each volume and the charge for a single volume is \$5.00. Copies of individual scripts are also offered for sale,

at a cost of \$1.00. These health dramas cover a variety of topics including: communicable diseases, industrial hygiene, occupational diseases, milk control, food poisoning, and maternal and child health.

Dr. Huntington Williams and his colleagues have done an expert job of blending education and entertainment in these radio dramas. The situations developed in the playlets are natural—that is, they dramatize episodes that might occur in any town, in any home. But at the same time they all contain the necessary elements of suspense and excitement. The dialogue is expertly handled and the essential health messages are put over with force and effectiveness.

Health departments in search of radio material should get in touch with the Bureau of Health Information, Department of Health, Baltimore, Md.

### PNEUMONIA THERAPY

Sera for most types of pneumonia had no sooner become established in medicine's armamentarium against the disease when sulfapyridine (with related compounds) was introduced. The drug's effectiveness in the treatment of pneumonia has led to its use on a wide scale. Thus it was not long before medical circles were pondering such questions as these: Should serum be discarded? Would sulfapyridine alone "do the work"? What is the relative

Please address samples of printed material, comments, or other editorial contributions to the editors at:  
One Madison Avenue, New York, N. Y.

value of the two agents when either is used alone or when they are administered in combination?

An article in the *Journal of the American Medical Association* (issue of December 21, 1940) supplies some pointed answers to these questions. These are found in a paper by Harry E. Dowling, M.D., Theodore J. Abernethy, M.D., and Clarence R. Hartman, M.D., entitled "Should Serum Be Used in Addition to Sulfapyridine?" An extensive study led the authors to draw the following conclusions, which are quoted verbatim from the *J.A.M.A.*:

1. A series of cases of pneumonia caused by pneumococcus Type I through type VIII have been alternated for treatment with sulfapyridine alone and with sulfapyridine plus specific antipneumococcus serum. The mortality rate was 12.5 per cent in the group receiving sulfapyridine alone and 9.8 per cent in the group receiving serum plus sulfapyridine.

If the type III cases are omitted, the corresponding figures are 9.2 and 4.5 per cent, respectively.

2. Serum seemed to be particularly valuable as an adjunct to sulfapyridine in patients over 40 years of age.

3. Crisis occurred more frequently and was more prompt in the patients receiving serum in addition to sulfapyridine.

4. It is suggested that serum and sulfapyridine both be given to patients over 40 years of age with pneumonia, and to those who are in need of a prompt defervescence.

The conclusions reached by Drs. Dowling, Abernethy, and Hartman seem to stress the desirability of continuing the selective use of serum with sulfapyridine, and should help to counteract the unfortunate tendency in some states toward the abandonment of serum altogether or, at any rate, stopping its official production and distribution.

#### MAGAZINE ARTICLES

Current popular magazine articles on health or of medical import:

"Famine Fighters." Paul de Kruif. *The Reader's Digest*. December, 1940.

"Supercharged Flour—An Epochal Advance." Paul de Kruif. *The Reader's Digest*. January, 1941.

"Hi, Doc." Webb Waldron. *Factory Maintenance and Management Magazine*. December, 1940.

"A Medical Chart for Winter Ailments." (This chart, in addition to listing the twelve most common disorders that occur during the winter months, also includes brief statements about the causative agent, early symptoms, transmission, contributing causes, and methods of treatment of each disease.) No author given. *Good Housekeeping Magazine*. January, 1941.

"Colds . . . what can we do about them?" Dorothy V. Whipple, M.D. *Parents' Magazine*. January, 1941.

"The Health of the Nation's Children." Thomas Parran, M.D. *Parents' Magazine*. January, 1941.

"The Alphabet of Vitamins." Jane Stafford. *The New Republic*. November 25, 1940.

"New Facts on High Blood Pressure." Iago Galston, M.D. *The American Mercury*. January, 1941.

"Adventures of a Sneeze Hound." Katharine Madison. *American Magazine*. January, 1941.

(The above is not presented as a complete list and the articles cited are not necessarily recommended.)

## MISCELLANEOUS HEALTH ITEMS

Frequent inquiries are received from health educators regarding the availability of old prints and drawings on medical subjects. One of the best sources that we can recommend is The Bettman Archive, 215 East 57th Street, New York, N. Y. Glossy prints (5" by 7") will be mailed for examination on any subject requested. The Archive states that it possesses prints on every subject "from Aardvark to Zymosis" and after an examination of its collection, we can endorse this claim.

The American Social Hygiene Association has quickly assumed its obligation with reference to the nation's defense preparations. Two attractive folders—one designed wholly for men about to enter the Army and Navy—are now available. "So Long Boys—Take Care of Yourselves" is the title of the publication for the men in the service. This is a straightforward discourse—written in man to man terms—that sets forth the needed facts about syphilis and gonorrhea. The second leaflet is a more elaborate presentation called "You Can Defend Them." It contains information about the association's work and carries an appeal for financial support. In the face of many brochures developed for the same purpose, we believe the association's folder is effective enough to meet the competition and encourage contributions from many of its readers.

Annual reports from health and welfare agencies are becoming increasingly effective in the manner of presentation, in the writing, in the use of photographs, and in general make-up. This is an encouraging development, as annual reports have long followed a "cut and dried" formula. *The 21st Annual Report of the Queensboro Tuberculosis and Health Association*, Jamaica, N. Y.,

is a striking example of the new trend. From cover to cover the report reflects careful planning with regard to typography, selection of pictures, and compilation of text.

The first campaign directed wholly against gonorrhea to be held in a major city in the United States was launched recently by medical and health groups in Rochester, N. Y. Among the agencies taking part in the campaign were: the County Medical Society, the State Department of Health, the Tuberculosis and Health Association, the Rochester Pharmaceutical Association, and the University of Rochester Medical School.

And now we learn that the fashion world has become vitamin conscious! New York fashion experts recently decreed that the "Vitamin Girl" is the girl of the hour. Gone are the days when Lillian Russell curves were in vogue! The 1941 "Vitamin Girl" is streamlined, she watches her calories and her food essentials, and takes her daily exercise. Any day now some enterprising drug manufacturer will probably start producing Vitamin Fashion Capsules!

## FILM NOTES

In the October, 1940, issue of "Credit Lines" an announcement was made that the American Social Hygiene Association contemplated producing a film on gonorrhea. While the association has not permanently abandoned its plans for this picture, it has been set aside in order that attention might be devoted to a film on a more timely subject—social hygiene and national defense. This production is now in preparation, and present indications point to a release date sometime during the latter part of February. No title has yet been selected.

The Metropolitan Life Insurance Company, in coöperation with the U. S.

Public Health Service, is releasing a one reel technicolor film entitled, "Proof of the Pudding." As previously announced in these columns, the picture deals with nutrition. The subject has been developed along lines that will appeal to family audiences particularly. The picture now is available only for theater use. Many health and related agencies are coöperating in its distribution and promotion.

The Health and Safety Section of the Tennessee Valley Authority has in the final stages of preparation a motion picture on malaria. It is said that this film will be especially notable for certain sequences showing phases in the life cycle of the malaria-bearing mosquito. The film will be used primarily for teaching purposes.

#### "WASTE NOT—WANT NOT"

"Bureau Brevities," a mimeographed sheet published by the Bureau of Social Hygiene of the Department of Health of the City of New York, recently issued a "Waste Not—Want Not" number containing much timely advice that every health department in the country might well heed. The publication points out that we have grown careless in our abundance and that the time is at hand to practise conservation, "to plug every waste hole."

Here are some of the items that are taken into consideration in the Bureau's conservation program:

1. Electricity—Turn off the lights when you leave a room! Don't let sterilizer current "go full blast" all the time!

2. Equipment—Try to salvage glassware, broken syringes, and the like! Try not to discard needles until the nurse-in-charge has had an opportunity to have them resharpened! Keep breakage down!

3. Supplies—Conserve all supplies, especially alcohol. Too much alcohol is sent into the sink!

4. Laundry, Paper Towels, Blotters—Use each of these items only for the purpose for which each is intended.

5. Telephone—The telephone is too convenient and most health department wires overloaded. Before you dial that number, THINK—would a post card do as well?

6. Postage—We have a tendency to "let ourselves go" when it comes to stamps. Frequently several letters are directed to the same person in the same office each day. Do you send each letter separately or do you put them all in one envelope?

7. Time—Avoid wasting time—Time is money and time is energy. When we waste time, we misspend energy as well as money.

#### RE: CLEVELAND'S HEALTH MUSEUM

*Museum News*, the official organ of the Cleveland Museum of Health, brings the good news that America's first museum of health is now a "going concern." It should be of interest to all health educators to know that public response to the Museum has been most gratifying. The exhibits have caught the interest of Cleveland's citizens as shown by the mounting attendance. Moreover, the Museum is already demonstrating its usefulness as a teaching center. Biology classes from Cleveland's schools, student nurses from local hospitals, members of druggists' associations, and representatives of social service organizations are among the groups that have studied the health exhibits.

We predict that the Cleveland Museum of Health will become a vital force for better living in the community and that many other cities will eventually follow in Cleveland's footsteps and establish similar museums dedicated to the pursuit of health and happiness. Here's a job for health educators: start a movement for a health museum in your community!

#### BELIEVE IT OR NOT—

Calculus made easy! Unless you have a talent for things mathematical, this statement will probably strike you as nothing more than a publisher's blurb for a new textbook. We have it on good authority, however, that the

statement is true. From Pennsylvania State College comes an announcement that two of the institution's professors have succeeded in condensing the whole of calculus into 40 pages—designed especially for those studying statistics. Since students of public health usually have to master at least a working knowledge of calculus, the news of this book will probably be welcomed as the answer to a long felt need.

It is said that this new text presents the essentials of differential and integral calculus for statistical studies in such a simple fashion that beginners with only a high school mathematical background can learn the necessary fundamentals in less than 10 hours. Any public health student who finds statistics "rough going" will doubtless consider this new book a godsend. The title—"Statistical Procedures and Their Mathematical Bases." The authors—Professors Charles C. Peters and Walter R. Van Voorhis, of Pennsylvania State College.

(P.S. Health educators who have a tendency to "become a little rusty" on their statistics will likewise be interested in this streamlined calculus text!)

#### NOTED AND QUOTED

In the January issue of "Credit Lines" a number of quotations touching upon various public health matters were printed under this heading. The editors have gleaned other quotations from various sources and this month we devote this space to a series pertaining to one subject of great concern to every public health worker—research.

"Research is an organized method of trying to find out what you are going to do after you can't keep on doing what you are doing now."

C. F. Kettering, Director of Research,  
General Motors Corporation

"The research of the laboratory is of no importance unless it can be applied to human betterment."

E. L. Bishop, M.D., Tennessee Valley  
Authority

"Research is a process by which more and more is found out about less and less."

Anonymous

"One small bit of information brought to light by the research laboratory may eventually prove to be worth many millions of dollars and save untold suffering."

Basil O'Connor, President, The National Foundation for Infantile Paralysis

"In view of the admitted need for more and better research, and because private philanthropy for such purpose seems to be vanishing, it would appear logical and desirable that the Federal Government assume a larger responsibility for leadership in scientific research."

Thomas Parran, M.D., Surgeon General, U. S. Public Health Service

"Intellectual curiosity is the mainspring of all research."

Anonymous

"If a man has real spirit there is no place on earth where he cannot develop himself—even do research. Remember Bunyan wrote his great works in prison."

A. S. Pearse, Ph.D., Professor of  
Biology, Duke University

"Whatever we do in this land of ours, we must never permit anything to interfere with scientific research which brings such great gifts to medicine, and through medicine, to humanity everywhere."

Walter C. Alvarez, M.D., Mayo Clinic,  
Rochester, Minn.

(If you would like to have this feature continued, please send the editors any quotations, slogans, or significant statements related to public health that appeal to you. We shall endeavor to print them. Please give the source of any material submitted.)

## BOOKS AND REPORTS

**Bacillary and Rickettsial Infections: Acute and Chronic. Black Death to White Plague—***By William H. Holmes. New York: Macmillan, 1940. 676 pp. Price, \$6.00.*

Dr. Holmes's treatise is a result of 27 years of teaching American medical students, and represents the methods of teaching evolved from that experience. In his own words, "It covers each subject with a reasonable degree of completeness consistent with its social, medical, and historic importance." The historical and social aspects of the various diseases included in this text are emphasized far beyond that usually encountered in a textbook of medicine. The author covers the field of the bacterial and rickettsial diseases in a single, moderate sized volume, and of necessity has dealt briefly with many of the diseases included within this group. The omission of the coccal infections, particularly the streptococcal and pneumococcal infections, from this volume is to be regretted.

The author believes that the value of the physician to society will be greater, and the general level of the practice of medicine higher, if a broad social point of view is instilled in the medical practitioners during their courses in medical school. Undoubtedly many textbooks of medicine embody a greater volume of conventional factual material, but Dr. Holmes has emphasized what might be called the philosophy of medicine.

Though written primarily for medical students, the author has maintained throughout a remarkable simplicity which should appeal to non-medical readers. The medical reader may criticise the author's admitted failure to provide

complete documentation of both the scientific and historical material presented for some of the diseases, but reasonably complete bibliographies are given for the *Pasteurella* and Rickettsial infections and for tuberculosis. The author's treatment of plague and tuberculosis is unusually complete and is interestingly presented.

Both professional and non-professional readers will enjoy the easy style in which the book is written, and the occasionally slyly humorous manner of the author. The entire book is interestingly annotated by the author, and contains a reasonably complete index.

ERNEST L. STEBBINS

**The 1940 Year Book of Public Health—***Edited by J. C. Geiger, M.D. Chicago: Year Book Publishers, 1940. 560 pp. Price, \$3.00.*

This review of the literature on public health, which necessarily includes the communicable diseases and epidemiology, is well done. In the 540 pages of text one will find systematically arranged under proper headings, abstracts from articles by 536 authors. The literature of the past year is well covered, and by consulting this book one is able at a glance, so to speak, to obtain a sketch of the latest studies in any particular line in which he is interested.

It is interesting to note the comparative space given to different topics, which is an indication of the interest which that particular subject is exciting at present. Child Hygiene is divided into General, Dental Hygiene, Mental Hygiene, and Nursing, some 62 pages being given to the entire subject.

Among other topics to which con-

siderable space is given are Food and Milk, Industrial Hygiene, and Administration, which is subdivided into Medical Care and Maternal Care.

The printing and make-up of the book are excellent and there is a good index of subjects and another of authors. The publishers of the Year Books as well as the Editor are to be congratulated on an excellent and useful volume.

MAZYCK P. RAVENEL

**Rheumatic Fever: Studies of the Epidemiology, Manifestations, Diagnosis, and Treatment of the Disease During the First Three Decades—***By May G. Wilson. New York: Commonwealth Fund, 1940. 595 pp. Price, \$4.50.*

In most parts of the United States rheumatic fever probably represents the third most important chronic infectious disease—after tuberculosis and syphilis. For this reason alone it seems high time that another comprehensive book about this disease should appear in this country; for to the reviewer's knowledge there has been only one previous volume by an American author devoted to this all important disease. But there are other reasons too why clinicians and public health workers should welcome the appearance of Dr. Wilson's big book, for besides including a series of studies on different aspects of rheumatic fever, it can serve as a text book, and a reference book as well.

In summarizing its contents one can hardly improve upon the statement to be found on the jacket which says:

Dr. Wilson presents in this volume the results of more than twenty years' study of the etiology, epidemiology, manifestations, course, diagnosis, prognosis, and treatment of childhood rheumatism. In her long experience in the cardiac clinics and wards of the New York Nursery and Child's Hospital, and the New York Hospital, she has had the opportunity to follow many cases of rheumatic fever and rheumatic heart disease from onset of the illness in childhood through the

years of adolescence and early adult life. She has made full use of her own rich experience in preparing this book, and has drawn upon the extensive literature of the disease. Each of the five parts has its own bibliography, and there are bibliographies in connection with discussions of particular interest.

Of particular interest to public health workers is Part 1, which includes a consideration of the epidemiology of rheumatic fever, and especially the familial epidemiology, which is a new and growing science in the field of all human chronic infections. Parts 2 and 3 review the symptomatology and the clinical course of the disease through the first 3 decades of life; and Parts 4 and 5 are concerned with diagnosis and treatment.

The author's approach to her subject is through the hospital clinic; her method is that of the clinical statistician. There are an amazing number of charts, diagrams, and tables in the book, and it is a little difficult to ascertain which of them deserves close attention. One cannot avoid wondering whether the statistical methods of analysis employed and the methods of their exposition, have been used enough with other diseases to make them understandable in this disease. In any event if one were to study and digest the vast amount of material in this book it would take at least a few weeks. This is not to be said in disparagement, however, for it is questionable whether a student of rheumatic fever could spend a few weeks in a better occupation.

JOHN R. PAUL

**Silicosis—Proceedings of the International Conference Held in Geneva from 29 August to 9 September 1938—***London: International Labour Office, 1940. 223 pp. Price, \$1.25.*

This is a compilation of the discussions at the Second International Conference on Silicosis and includes the text of the reports submitted by a num-

ber of experts from the various countries that participated. Members of the committee were present from nine countries. The United States was represented by Dr. Leroy U. Gardner and Dr. R. R. Sayers.

The object of the Conference was to study the progress in knowledge of silicosis since the Johannesburg Conference in 1930 and to discuss the effects of the inhalation of nonsiliceous dusts, especially the pneumoconiosis affecting coal miners. Space will not permit a review of the many interesting papers that were presented on the various phases of the dust problem. However, a few of the more important conclusions and recommendations of the Conference are given.

1. The Conference reaffirmed the definition of silicosis arrived at by the 1930 Conference that "silicosis is a pathological condition of the lungs due to inhalation of silicon dioxide. It can be produced experimentally in animals." It recommended that the term "rapidly developing silicosis" be used instead of "acute silicosis" to designate certain cases in which silicosis develops very rapidly.

2. Silicosis occurs among workers in coal mines when the dust to which they are exposed contains silica.

3. Production of silicosis in industries and occupations is always associated with the inhalation of silica dust with or without admixture of other dusts.

4. The early diagnosis of silicosis is based upon:

- (a) The employment history, including conditions involving exposure to silica dust
- (b) A complete clinical examination
- (c) A technically satisfactory x-ray examination

5. In view of the marked progress that has been made in dust sampling methods, the Conference recommended that when the incidence of silicosis in working places is investigated the character of the dust present be determined at the same time; that when publishing the results investigators in the various countries express the dust counts in terms of particles per cc.; and that while using whatever instruments he prefers each investigator also include various available types so that at some future time comparable results may become available.

6. As the problem of silicosis is essentially

a medical one, the valuable contributions made by physicists, geologists, chemists, engineers, biologists, and other professional men should be coordinated and correlated by competent medical authorities.

7. The assessment of incapacity can be determined only by complete examination; radiographic findings do not necessarily bear any definite relation to the degree of incapacity.

8. Methods of prevention recommended are initial examination of workers, campaign against dust in general and silica dust in particular, and personal protection by means of masks.

9. The Conference was not cognizant of any specific therapeutic measures in the treatment of silicosis nor of any method of stimulating the elimination of silica from the lungs.

10. The Conference considered that it would be of great advantage to workers in the field of dust prevention if the results of individual experiments could be made available to all. It was recommended that the International Labour Office be charged with collecting such information, and distributing it as soon as possible to all interested persons.

It was also recommended that conferences be convened periodically at intervals of three years.

R. R. SAYERS

**Manson's Tropical Diseases —**  
*Edited by Philip H. Manson-Bahr, M.D. (11th ed. rev.) Baltimore: Williams & Wilkins, 1940. 1,083 pp. Price, \$11.00.*

One always welcomes a new edition of this standard textbook on tropical diseases first published 42 years ago by Sir Patrick Manson, the father of modern tropical medicine. The advances which have been made in our knowledge of tropical diseases since the first edition was published have been tremendous and are reflected in the present volume. Probably no one in the world is better fitted than Manson's son-in-law to present authoritatively from his personal experience this broad field of medicine so little known to most physicians and public health workers in the United States.

The introductory chapters on Life in the Tropics present the practical prob-



lems of the foreigner going to these regions. The book is divided into sections on Fevers, Vitamin Deficiency Diseases, Abdominal Diseases (mainly Diarrheas), Infective Granulomatous Diseases, Diseases of the Central Nervous System, Tropical Venereal Diseases, Tropical Skin Diseases, Local Diseases of Obscure Origin, Animal Parasite Diseases, and Diseases due to Poisons of Vegetable and Animal Origin. These sections are followed by an appendix on Medical Zoölogy and Laboratory Methods.

The book is splendidly illustrated with 18 color plates, 15 half-tone plates, 364 figures in the text, 6 maps, and 28 charts. Many of the color plates and other illustrations were made by the editor himself.

The descriptions of diseases are accurate and mostly based on personal experience. Methods of treatment are given in great detail; indeed, one might wish that the author would express more definitely his opinion on the relative merits of various methods of treatment. The ineffectiveness of plasmochin in the treatment of malaria is not sufficiently emphasized, and the short course of malaria treatment advocated by the Malaria Committee of the League of Nations is not presented. In the treatment of hookworm, the use of trichlorethylene is mentioned but tetrachlorethylene is not mentioned, while carbon tetrachloride, which has caused a number of deaths, is given considerable space. Although the whole book has a distinctly British point of view this is inevitable because the author's background expresses primarily the experience of the British colonial workers who have contributed most to the advance of tropical medicine.

With the increasing interest of the United States in the medical problems of Tropical America, this book should find a place in the library of every

agency and student concerned with the field of medicine and public health in warm climates.

HENRY E. MELENEY

*The Virus: Life's Enemy—By Kenneth M. Smith. New York: Macmillan, 1940. 176 pp. Price, \$2.00.*

A review of this book would be facilitated if one were sure for what class of students it is intended. The author has apparently experienced some of this same indecision, as shown by his tendency to lead gently into the center of the academic argument and suddenly to slip into the minutiae of scientific detail. There appears to be a conflict between a natural tendency to accurate scientific exposition and a duty of explaining the point in "speaking English." The presentation is too technical for the layman, too cursory for the student of the virus problem. One must assume, therefore, that the review is directed toward the reader well grounded in the basic sciences who is not familiar with the present state of virus research.

Nevertheless, in its 176 pages there is meat for all. Part I, *The Nature of the Virus*, comprises three brief chapters. The first of these summarizes the development of thought concerning the cause of infectious diseases; the second deals essentially with physicochemical methods of studying the properties of viruses; the third, *What is a Virus?* covers the current discussion concerning their place in nature as degenerate living organisms or protein molecules. Part II, *The Virus in Action*, is concerned with the modes of transmission, an extremely stimulating chapter on the rôle of insect vectors of virus diseases, the interaction of the virus and the affected cell and variations in viruses. There is then a brief summary of the essential features of important virus diseases in man, animals, insects, and plants. The final chapter discusses

clearly the problem of prevention and control of virus diseases, using recent studies as illustrations, and presents a contrast of the approach to prevention of virus diseases in animals and plants.

The sequence is admirable and, within the narrow confines of this book, the author summarizes a tremendous amount of material in a thought-provoking manner. Dr. Smith draws deeply on his experiences in plant pathology to which he has made notable contributions and he is at his best in those portions of the book in which the argument is illustrated by the problems which arise in his own field.

There are certain general statements which may not be fully acceptable, such as that prontosil dissolves the capsules of bacteria, p. 162; that monkeys are the normal reservoirs of yellow fever, p. 156; that equine encephalomyelitis is entirely a matter of mosquito transmission, pp. 71, 85; or that spotted fever in the United States is transmitted by the dog tick, p. 89. The illustrations are clear and well selected. There is no bibliography.

THOMAS FRANCIS, JR.

**Your Health: A Guide to the Medicine and Public Health Building, New York World's Fair, 1940—***New York: American Museum of Health, Inc., 1940. 96 pp.*

This well written guide contains, in the proverbial nutshell, explanations and illustrations of the entire array of Health Exhibits at the New York World's Fair of 1940. In the first pages of the book are a complete table of contents, an index of the individual exhibits, a foreword by George McAneny, president of the American Museum of Health, and a brief section on the aims of the American Museum of Health by Homer N. Calver, secretary of the organization.

The remainder of the guide is divided into two main parts; the first being

devoted entirely to the Hall of Man, and the second to the Hall of Medical Science. In each part is included a key to the various sections of the exhibit, and a brief but pertinent write-up with illustrations of each. Among these may be mentioned the Pulsation of Life, Eating and Drinking, The Story of Diphtheria, and Cancer.

*Your Health* aims to tell the public, in exhibit terms that can be understood by the layman, how the body is made and how it functions; how to combat disease and conserve life. Within space limitations these aims have been well met through a vivid, clear, readable, and accurate presentation. The attractive cover as well as the numerous illustrations are to be commended. Photographic plates of the Pulsation of Life and Transparent Man are especially striking. This book is of special value to the teacher of health education in the schools and the public health educator as a source teaching concepts and ways in which they can be visualized.

C. E. TURNER

**Simplified Diabetic Manual—***By Abraham Rudy. New York: Barrows & Co., 1940. 216 pp. Price, \$2.00.*

The first few chapters of this book deal with the definition of diabetes and what happens to the food in the body. These are very elementary and are suitable for laymen only.

The next chapters, however, are more detailed, the discussion of the causes of diabetes and the stress laid upon obesity and heredity is very important. The marriage problem of the young diabetic and the future effect is brought forward. The author then goes into the complications of diabetes, how, possibly, to treat them and how to prevent them. He gives instructions to young and old, as their conditions require. Insulin is carefully described in its various forms, and the dangers of insulin, sensitivity, reactions and atrophies are described.

A large part of the book, and the most important, is devoted to the dietary treatment. Here the author excels many other volumes prepared for diabetes. The diet menus are graphically portrayed and so are the carbohydrate percentages in food. The deficiency states in avitaminosis and their treatment are described in detail. There are many graphs, tables, and charts prepared for simple and practical utilization.

The chapters on diets to suit various nationalities, and the simplicity of the menus are of value to all concerned with the problems of diabetes.

The reviewer deems this book excellently suited to the needs of the diabetic.

MORRIS ANT

**Borrowed Children: A Popular Account of Some Evacuation Problems and Their Remedies—**  
*By Mrs. St. Loe Strachey. New York: Commonwealth Fund, 1940. 168 pp. Price, \$.75.*

Everyone interested in the 734,883 British children who were evacuated in September, 1939, from large cities to places in England thought to be safe, will want to read this little volume.

The story of the emotional struggles and adjustments of these youngsters and of their acceptance into English homes by families accustomed and unaccustomed to children is both moving and revealing.

*Borrowed Children* presents both successful and unsuccessful adjustments. It contains much of interest to all seeking an understanding of child psychology and behavior problems of children, and is important to those who have contact with the children who have come to this side of the Atlantic seeking safety. Notable in this book is the will to understand and help in the difficult situations which are described. The careful analysis of these experiences may lead to clearer understanding of

children's problems the world over. It presents a clear case for the Child Guidance Centers which the Commonwealth Fund has developed.

ALTA ELIZABETH DINES

**Food, Nutrition and Health—**  
*By E. V. McCollum, Ph.D., Sc.D., and J. Ernestine Becker, M.A. (5th ed.) Baltimore: Lord Baltimore Press, 1940. 127 pp. Price, \$1.50.*

The authors state that their objective "has been to present the established facts about nutrition in non-technical language, and to show what can and what cannot be accomplished through diet." Furthermore they have "attempted to point out some of the common fallacies about diets which have done and are still doing much harm to credulous and uninformed people." It is a real problem to reduce to about 100 pages material that usually requires a good sized volume, and the authors have had to sacrifice clarity for brevity. These sacrifices occur, however, at such rare intervals that one must conclude that the authors have been successful in accomplishing their objectives.

The book is divided into 24 chapters. The first 10 deal with the vitamins, and one chapter of 8 pages is concerned with minerals. To one already familiar with these subjects, the reading of these chapters will unconsciously be supplemented by what the reader already knows. To the novice, however, their perusal will lead to questions that must remain unanswered unless sufficient interest has been aroused to stimulate further study. For this reason such a concise array of information leaves much to be desired.

The next three chapters discuss foods of vegetable and of animal origin and coffee and tea. The remaining chapters form an admirable brief presentation of the influence of foods upon teeth, in pregnancy and lactation, upon the

nervous system, the digestive tract, the acid-base balance, body weight, longevity, and health in general. At the end of the book are menus for those of normal weight and for those overweight. There is also a tabulation of foods giving the distribution of vitamins A, B, C, D, and riboflavin.

For a brief and authentic presentation of nutrition this book well serves its purpose and should serve as well to stimulate further reading.

IRA A. MANVILLE

**Holt's Diseases of Infancy and Childhood**—By *L. Emmett Holt and John Howland*. (11th ed., Revised by *L. Emmett Holt, Jr., and Rustin McIntosh*.) New York: Appleton-Century, 1940. 1421 pp. Price, \$10.00.

Ever since the first edition of this text appeared in 1896 from the pen of the older Holt it has been recognized as an authoritative, comprehensive, and practical treatise which attempts "to furnish a guide to practical therapy based on a thorough understanding of the nature of disease." Dr. Holt, who himself revised the first four editions, made the volume the standard textbook of pediatrics in the English language—a position each succeeding edition has been able to hold.

To scan these volumes gives one as well a picture of the development of preventive pediatrics, a subject of no small interest to the public health worker of today. Dr. Holt was a pioneer in and founder of preventive pediatrics in this country—a man with a keen sense of social responsibility. The authors of the current edition, though more deeply steeped in the tradition of the laboratory, have nevertheless kept an eye on those developments which are claimed by some to belong to the "public health field." It may well be said that this book is in essence a manual of public health as

well as of pediatrics, for the prevention of specific morbid conditions and the maintenance of optimal health is taken for granted as the goal of the pediatrics which the authors propound.

This edition differs from the earlier ones in that the services of 34 collaborators have been secured in writing the volume. Conspicuously lacking are the faults usually found in volumes so produced. Drs. Holt and McIntosh have carefully balanced and rewritten the contributions so that a harmonious treatise results, one the richer probably because so many specialists could be given an opportunity to discuss the particular field in which they are expert.

Little of the tenth edition remains intact. The inclusion of information from articles from almost current journals is startling—as, for example, the toxic effects of sulfathiazole, or the administration of vitamin K to the mother before delivery as a protection against hemorrhage in the new-born infant. The sections on hygiene and care have doubled in length with excellent reviews of the contributions from the field of normal growth and development, and those on nutrition and the premature infant and the new-born, diseases of endocrine origin, and of the mouth, nose, throat and ears have been enlarged. All these sections are of particular interest to those in public health. There is a new section on the eye, and there are many new illustrations. The table of contents has been improved; the index is lengthy and useful. This reader wished that in the bibliographies accompanying each subject, inclusive pages of journal references, and total pages of books had been included so that she could have had some hint of the quantity of information to be gained from further perusal of a given item, the quality of which was already indicated by its inclusion in the bibliography.

LEONA BAUMGARTNER

**Advances in New York City's Health:** *The Annual Report of the Department of Health of the City of New York for 1939, with a Review of Developments from 1934 to 1939*—By John L. Rice, M.D. Savel Zimand, Editor. New York: Department of Health, 1940. 296 pp.

For the third time Mr. Zimand edits the year's record of the all-star team, Mayor LaGuardia and Dr. John Rice. "Graphically written and full of teaching," Sir Arthur Newsholme's comment on the 1937 report, applies fully to this latest volume, with its telling illustrations, terse titles and striking charts which show the conquest of pestilence since 1800 in America's greatest city.

"Spending Dollars to Save Lives" is the caption for the vital section on the annual budget, and when the last chapter has been read it is abundantly clear that the modest investment of 76 cents per capita has produced rich dividends for the people and for the metropolis. Such expressions as "In the fall of 1939, a new procedure became effective . . ." and "Obsolete records were removed, unnecessary clerical work and unnecessary inspections were eliminated, and the quality of the work was greatly improved" can be looked for under almost any heading, and bespeak a vibrant, progressive health department eager to make every appropriated penny pay and every service superior to what it has been.

The reader will be struck by the success achieved in replacing part-time with full-time qualified personnel in key positions, by the many evidences of staff training and by the reiteration on the educational nature of the task, which is the very essence of effective public health work. Again, the decentralizing of the great main office into superb District Health Center buildings for neighborhood performance; with proper focus on relationships with the

medical profession and medical schools, with the advancing programs for housing and welfare and community planning and research, and with the hospitals and their morbidity records—all these are samples of the proof that much careful thought and effort have been given to sound policy, which has not been allowed to suffer because of an appalling maze of administrative detail.

It is with some difficulty that the facts on population and on some of the communicable diseases are found, and another year perhaps one will see a record of the vital statistics for Negroes, and other data such as the percentage of the child population that has been inoculated for the prevention of diphtheria. It may even be that the new symbol STS for "serologic test for syphilis" will replace the outworn word Wassermann, and that it will be clear to the reader whether or not the reported cases of poliomyelitis refer only to such as showed paralysis or muscle weakness. Then too, if nearly two-thirds of all deaths being listed as due to cancer, diabetes and cardio-vascular-renal diseases constitutes "a definite challenge," one is tempted to wonder in which among the *List of Causes of Death* the statistician would welcome an increase as normal and desirable. Surely a health administrator's aim should be to postpone but never to prevent a death.

To be one of the shock troops or public health G-men whose deeds are set forth in this chronicle must surely be cause for inspiration and congratulation.

The record is one that will stimulate emulation on the part of the professional friends of the New York City Health Department. Indeed, they have already come to expect and will continue to look for reports of like advances in the years that lie ahead.

HUNTINGTON WILLIAMS

Hugh Young: A Surgeon's Autobiography — *New York: Harcourt, Brace*, 1940. 554 pp. Price, \$5.00.

The prostate which makes other men old made, it is said, Hugh young. Accordingly, "that seductive man" places in the midst of his biography 125 pages of description of operations that, in spite of the perfect illustrations by Didusch, are as little attractive as could be imagined. It must have been exuberance that dictated these pages for they serve no purpose except that of satisfying a morbid curiosity with which the author would perhaps sympathise more than the rest of us do; all set down in a popular style that precludes precision.

The earlier chapters on his youth and ancestry are charming, the 200 pages devoted to what is beginning to be called in England the "four years' war" less historical than Rabelaisian. Future memorials to this distinguished citizen will perhaps lay emphasis not so much on the Brady Urological Institute and its director's unquestioned preëminence in American urology or his saving the A.E.F. from syphilis, as on the man who did so much for Maryland and Baltimore, even if he did his best to make the ladies blush.

To us who have watched his meteoric success and the intuition, the wit, the deliberate almost foolhardy daring that builded this success, comes a chuckle as we compare the life of Hugh Young, set down here with such disarming candor, and that of another Hopkins man, as inspired, as gay, more broad, even more sympathetic and generous, more industrious, less egotistical for all his pranks: William Osler. How fundamentally like to his granddad each of them was. H. H. Y.'s grandfather, General W. H. Young, having killed a buffalo, "remembered that the animal had a supernumerary stomach which was filled with water and newly

cropped hay," so he slit the stomach with his bowie knife and, compressing the hay with the buffalo's tail, drank the water "which he assured me was pure and palatable." Be careful what grandparents you choose, boy!

A beautifully printed book with colored plates of handsome Hugh and ugly Jim. To be read for the joy that has always drenched Dr. Young's life, by those whom hermaphroditism and prostatism and egotism and shameless laughter do not shock.

EDWARD L. KEYES

Coöperation in the Administration of Tax-Supported Medical Care — *By The Committee on Medical Care, American Public Welfare Association. Chicago: American Public Welfare Association (1313 East 60th Street)*, August, 1940. 32 pp. Price, \$.20.

State and local health officials should give thoughtful attention to this study of Tax-Supported Medical Care, by the Committee on Medical Care of the American Public Welfare Association. The work of this committee since its appointment in 1937 has emphasized the administrative confusion resulting from division of authority, and lack of coöperation in this field. Examples of such confusion resulting from division of authority in the administration of tax-supported medical care at state and local levels are given. The authors stress the fact that to achieve the maximum results, the administration of all preventive and curative medical services should be closely related and functionally coöordinated. Admitting that it is frequently impractical at the present time to consolidate all tax-supported preventive and curative services into a single governmental unit, they suggest measures for bringing about coöordination and integration of services between different departments. Examples of coöperative relationships existing between governmental agencies

at national, state, and local levels are reviewed. Health officials should be grateful for this intelligent discussion of a difficult administrative problem. It should be of interest to all agencies and individuals concerned with the administration of tax-supported medical care.

BENJAMIN G. HORNING

**Dermatology and Syphilology for Nurses, Including Social Hygiene—**By John H. Stokes, M.D. (3rd ed. rev.) Philadelphia: Saunders, 1940. 365 pp. Price, \$2.75.

For many years Dr. John Stokes has influenced the thinking of nurses in institutions and in public health through his numerous lectures and writings on syphilis and social hygiene. Through his book, *Dermatology and Syphilology for Nurses*, first published in 1930, he has taught many students the symptoms and treatment of cutaneous diseases, of syphilis and of gonorrhea. Its terse, crystal clear descriptions, enhanced by "thumb nail sketches" and summaries, have been invaluable to undergraduate and graduate alike, and its pioneer emphasis upon a sane, scientific, and humane attitude toward the victims of the genitoinfectious diseases, has been a force in dispelling prejudice and misconceptions.

Nurses everywhere will welcome the advent of the third edition of this excellent book. The entire text of the 1935 edition has been carefully revised and brought up to date. There are additions to the sections on skin diseases, such as may be found under ringworm, ticks, urticaria decubital ulcers, etc. The chapters on syphilis and gonorrhea contain new and valuable details on fever therapy and the use of sulfanilimide. There is a review of the recent rapid developments in the public health control of syphilis and gonorrhea; and a chapter by Louise Ingraham, on contact tracing and follow-up technics, which describes the

methods of the Institute for the Control of Syphilis at the University of Pennsylvania.

With these and other additions and changes the book retains all of its earlier features including the psychological and social hygiene considerations which are woven into the general text and discussed as separate topics in the final chapters. GLADYS L. CRAIN

**Dietetics Simplified: The Use of Foods in Health and Disease—**By L. Jean Bogert, Ph.D.; Laboratory Section, by Mame T. Porter, M.A. (2nd ed.) New York: Macmillan, 1940. 742 pp. Price, \$3.00.

This practical, thoroughly scientific text on dietetics should be of service to students in home economics courses, to hospital dietitians, to public health nutritionists, to nurses, and to medical students. It should prove useful to physicians who wish to educate their patients along dietary lines. Intelligent housewives will find it a valuable aid in coping with the feeding problems of families. Sample menus and dietaries are lucid and practical. Illustrations are pertinent.

The scope of the book includes a discussion of elementary nutrition, diet in normal conditions, and therapeutic diets. Each disease is treated with other conditions which require diets of a similar nature. All therapeutic diets are presented as variations of the normal diet with particular emphasis on the importance of maintaining nutritive essentials in all diets which are to be continued any length of time. The author presents various schools of thought regarding certain therapeutic diets where there is not as yet complete agreement.

Food prices for 1940 are included in the discussion of diets at different cost levels. Food problems due to racial habits should be of particular interest to public health workers.

The new figures by Chatfield and Adams on "Nutritive Values of Foods" in the appendix, issued by the U. S. Department of Agriculture in 1940, are an important feature of the book. Approximate vitamin values of foods are also listed in terms of standard International units whenever possible.

The first half of the planned laboratory lessons deal with cookery and normal conditions of the diet. The latter half consists of planning diets for diseased conditions along with the case history and dietary study on a selected patient. This practical application should facilitate better understanding of the principles of nutrition and result in more wholesome and attractive meals.

AGNES M. ENGLISH

**Experimental Poliomyelitis**—By Morris Schaeffer and Ralph S. Muckenfuss. *New York: National Foundation for Infantile Paralysis, Department of Health of the City of New York, 1940.* 158 pp. Distributed free of charge.

Perhaps one should first read Part II of this monograph, wherein a large number of neutralization tests, done with one lot of pooled convalescent serum against a single strain of poliomyelitis virus, demonstrate that the neutralization test, as at present performed, is a crude biologic procedure with an error of about one in six, and that it is not amenable either to niceties of titration or of interpretation as an individual test. With the experimental observations of the authors in mind, one cannot but agree with their conclusions from a critical review of the literature, which appears in the first part of the monograph—that many problems are excluded from investigation by the neutralization test in its present form, and that many of the deductions based on the results of neutralization tests have been unwarranted.

The procedure finds its greatest

practical usefulness in survey work, concerned not with single tests on single individuals, but with trends of immunity in larger groups of individuals. When used in this way, irregularities or inconsistencies in results, being reversible, tend to balance each other, thus affording probably reasonably accurate readings concerning immunity in larger groups.

In short, the work seems to show that variations in this test are of a biologic nature, similar to those occurring in other tests of this sort, and that if serum-virus mixtures could be inoculated in multiples of six and a reading taken of five out of six, as is done in many other such tests, the neutralization test would take its place with such antigen-antibody tests as that for the detection of diphtheria antitoxin or yellow fever immunity.

W. LLOYD AYCOCK

**Communicable Diseases**—By Nina D. Gage, M.A., R.N., and John Fitch Landon, M.D. *Philadelphia: Davis, 1940.* 411 pp. Price, \$3.50.

This is an excellent up-to-date book for nurses; in fact, the most usable book this reviewer has seen on this subject. It assumes a previous knowledge of bacteriology and the general principles of infection and immunity, merely reviewing the latter very briefly in an introductory chapter. Though the authors state in the preface that the book is designed to meet the needs of the nurse working in homes as well as the nurse in the hospital, the major emphasis is on the hospital situation, and the authors are apparently more familiar with hospital routines than with home conditions. Though the adaptations for home care are usually quite sensible they are described briefly and come almost as afterthoughts at the end of each chapter. The authors state that the technic at home should be simple but they do not carry this



thought out when giving specific directions.

The major part of the book deals with the diseases themselves. These are divided into three units: first, the major diseases, these being the most prevalent and serious ones in this country; second, the minor diseases, and a third unit which includes diseases the authors say "are more properly handled in general textbooks of medicine . . . but may be encountered in public health work and in communicable disease hospitals." This unit includes pneumonia, tuberculosis, typhoid fever, syphilis and gonorrhea.

The discussion of each disease is divided into medical and nursing aspects. In the first there is a description of the important features of the disease including epidemiology, symptomatology, complications, differential diagnosis where indicated, prognosis, prophylaxis treatment, and the isolation and quarantine regulations. One wonders why the authors used the New York City Board of Health regulations for isolation and quarantine rather than those suggested by the Subcommittee on Communicable Disease Control of the Committee on Research and

Standards of the American Public Health Association. It would seem that the latter would have more weight in all parts of the country. The second part describes the nursing care of the disease, under such headings as room temperature, asepsis, care of the skin, care of the eyes, nose and throat, diet, mental care, heart, complications, convalescence, and terminal disinfection. Not all these subjects are included in the discussion of each disease, but only the ones which have special significance for the nursing care of the particular disease under consideration. A chapter on sulfanilamide and its derivatives has been added in this second edition, and to bring the book up to date, necessary changes have been made in the text.

The book is exceptionally well organized and clearly written. An outline of each chapter appears under the chapter heading and each section of the outline is marked in the text with bold face type. This makes the book especially useful for reference and very easy to follow. It can be highly recommended as a text for schools of nursing and also as a reference book for graduate nurses.

MARGARET G. ARNSTEIN

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

**For More Glorious Fourth**—Only those states that have enforced state-wide laws controlling the use of fireworks have shown a satisfactory reduction in Fourth of July accidents. This is the conclusion of the annual compilation of fingers blown off and eyes gouged out.

ANON. Fourth Annual Summary of Fourth of July Injuries. *J.A.M.A.* 115, 26:2274 (Dec. 28), 1940.

**Psittacine Pests**—For the men and women who simply must associate with parrots, parrakeets, etc., this editorial brings good cheer. A fairly reliable complement-fixation test can be made upon the birds to determine their freedom from psittacosis and, should a mistake be made, there is available a curative serum to help the misguided pet owner recover from the disease. What prompts anyone to want a parrot in the first place is not considered.

ANON. The Problem of Psittacosis. *J.A.M.A.* 115, 24:2088 (Dec. 14), 1940.

**Pressure Respiration** — Probably you will find little practical need for this information but you may still want to know about this interesting contraption for alternating air pressure. Tuberculous patients put in it can stop breathing because the alternate high and low air pressures ventilate the lungs sufficiently. By this means the lung tissue can be rested even though both sides of the lungs are diseased. Ingenious, isn't it?

BARACH, A. L. Immobilization of Lungs Through Pressure. *Am. Rev. Tuberc.* 62, 5:586 (Nov.), 1940.

**Distribution of Medical Services**—Illness rates are highest in those groups least able to meet the costs, and those persons who are in the lowest economic level receive the least medical care. Hard-up residents of small communities are the worst off in this respect. You probably suspected this to be true, and here is the evidence to confirm your fears.

BRITTEN, R. H. The National Health Survey. *Pub. Health Rep.* 55, 48:2199 (Nov. 29), 1940.

**Adjunct to Cancer Research**—At Baltimore, the Public Health Service maintains a tumor clinic which serves as a demonstration of the life saving possibilities of adequate cancer treatment. In the first 8 months of its existence 226 patients were treated.

BRYAN, E. R. The Tumor Clinic of the Baltimore Marine Hospital. *Pub. Health Rep.* 55, 48:2195 (Nov. 29), 1940.

**Tuberculosis Problems Nos. 1 and 2**—In his inspiring presidential address to the National Tuberculosis Association the author labelled the provision of sufficient treatment facilities and an adequate preventive educational program as Problems 1 and 2. Then he explored some of the possibilities in the fields of chemistry and nutrition which some day may help to change the still serious picture.

CHADWICK, H. D. A Review of the Campaign to Eradicate Tuberculosis. *New Eng. J. Med.* 223, 25:1031 (Dec. 19), 1940.

**After One Hundred and Fifty Years**—There is still plenty of small-pox, and each year people die of the

disease. Even health workers tend to ignore this astounding fact for most of the cases and deaths occur out in those wide open spaces where rugged individualism reigns. In the East where we docilely submit to vaccination, smallpox does not exist. You will find effective ammunition here for your anti-vaccinist backfire.

DAUER, C. C. Smallpox in the United States: Its Decline and Geographical Distribution. *Pub Health Rep.* 55, 50:2303 (Dec. 13), 1940.

### About a Much Needed Survey—

To what extent do health workers meet the qualifications set up by the Education and Qualifications Committee? How much training would have to be given them before they could meet the standard? A study of the level of training and experience of the present crop of health workers is reported in this, the first of a series of papers. You had better read it and get in upon the ground floor.

DERRYBERRY, M., and CASWELL, G. Qualifications of Professional Public Health Personnel. *Pub. Health Rep.* 55, 50:2312 (Dec. 13), 1940.

**Oral Immunization for Scarlet Fever**—Ingestion of concentrated scarlatinal toxin in enteric coated tablets immunized susceptible persons against scarlet fever. The authors do not suggest the substitution of this method for hypodermic injection, but point out its definite advantages under certain conditions.

DICK, G. F., and DICK, G. H. A Preparation of Toxin Suitable for Oral Immunization Against Scarlet Fever. *J.A.M.A.* 115, 25:2155 (Dec. 21), 1940.

**Pneumonia**—In this comparison of pneumonia cases treated with sulfa-pyridine alone or with the drug combined with the analogous serum the results of the latter were so much better, especially with patients over 40, that the combination of treatments is

suggested for them and for those in need of a prompt defervescence.

DOWLING, H. F., *et al.* Should Serum Be Used in Addition to Sulfapyridine? *J.A.M.A.* 115, 25:2126 (Dec. 21), 1940.

**For a Healthier Nation—**Pointing the remaining weak spots in the anti-tuberculosis program—inadequate case finding and rehabilitation services—this article presents a clear picture of the present-day situation. If we really are to act intelligently in dealing with this completely remediable public health hazard we must get busy along the lines laid down.

DUBLIN, L. I. No More Tuberculosis by 1960. *Survey Graphic.* 30, 1:30 (Jan.), 1941.

**Fumigated Foodstuffs**—It seems that fresh vegetables and certain other foodstuffs shipped out of insect quarantine areas are fumigated with methyl bromide to kill the bugs. Extensive studies were made which lead to the conclusion that not enough bromide remains on the food to be harmful to the consumer. This is just another of those miscellaneous items for you to store away.

DUDLEY, H. C., *et al.* Studies on Foodstuffs Fumigated with Methyl Bromide. *Pub. Health Rep.* 55, 49:2251 (Dec. 6), 1940.

**Sound Advice Widely Needed**—Of the 11 recommendations for the improvement of tuberculosis control administration in the city of Baltimore, only one applies to the city alone; all the other 10 can be taken to heart by any municipal health board really intent upon ending the spread of tuberculosis—an entirely practical project widely neglected.

FREEMAN, A. W. A Survey of the Facilities for the Prevention of Tuberculosis in Baltimore, Maryland. *Baltimore Health News.* 17, 12:90 (Dec.), 1940.

**Plague**—Just to remind you that it can happen, a report is published upon

three outbreaks of pneumonic plague that occurred in South America. There is nothing novel or startling in the account, but it is worth remembering that the mortality rate approximates 100 per cent.

MURDOCK, J. R. Pneumonic Plague in Ecuador During 1939. Pub. Health Rep. 55, 47:2172 (Nov. 22), 1940.

**To Be Read and Digested**—Influenza antibody levels were determined among 1,101 persons in a rural com-

munity. Then quite providentially an epidemic occurred, and the antibody levels among those who were attacked and those who escaped were determined for a year after. It would be inexcusable to spoil the report of this outstanding study by abstracting the conclusions here. It deserves careful reading in its entirety.

RICKARD, E. R., *et al.* A Comprehensive Study of Influenza in a Rural Community. Pub. Health Rep. 55, 47:2146 (Nov. 22), 1940.

## BOOKS RECEIVED

SOCIAL WORK YEAR BOOK, 1941. Russell H. Kurtz, Editor. Sixth Issue. New York: Russell Sage, 1941. 793 pp. Price, \$3.25.

NOTTER & FIRTH'S HYGIENE. Revised by L. C. Adam and E. J. Boome. 10th ed. New York: Longmans, Green, 1940. 518 pp. Price, \$3.50.

BACTERIOLOGY IN NEUROPSYCHIATRY. By Nicholas Kopeloff. Springfield, Ill.: Thomas, 1941. 316 pp. Price, \$4.50.

HOW TO PREVENT GOITER. By Dr. Israel Bram. New York: Dutton, 1941. 182 pp. Price, \$2.00.

ORIENTATION IN AMERICAN DENTISTRY: ITS HISTORY AND SOCIAL-PROFESSIONAL BACKGROUND. By Alfred J. Asgis. New York: Clinical Press, 1940. 123 pp. Price, \$2.50.

STUDIES IN AMERICAN DEMOGRAPHY. By Walter F. Willcox. Ithaca, N. Y., 1940. 556 pp. Price, \$4.50.

THE COMPENSATION OF WAR VICTIMS. Washington: International Labor Office, 1940. 91 pp. Price, \$.50.

THE DOCTOR TAKES TO THE AIR. (Part of Bulletin No. 34, December 10, 1940.) New York: Public Relations Bureau, 1940. 28 pp.

PLAGUE ON US. By Geddes Smith. New York: Commonwealth Fund. 1941. 365 pp. Price, \$3.00.

HYGIENE. By Florence L. Meredith. 3d ed. Philadelphia: Blakiston, 1941. 822 pp. Price, \$3.50.

I REMEMBER. THE AUTOBIOGRAPHY OF ABRAHAM FLEXNER. New York: Simon and Schuster. 414 pp., 1940. Price, \$3.75.

SEWAGE-TREATMENT WORKS. Administration and Operation. By C. E. Keefer. New York: McGraw-Hill, 1940. 673 pp. Price, \$6.00.

A HISTORY OF MEDICINE. By Arturo Castiglioni. New York: Knopf, 1941. 1013 pp. Price, \$8.50.

PHOTODYNAMIC ACTION AND DISEASES CAUSED BY LIGHT. By Harold Francis Blum. New York: Reinhold, 1941. 309 pp. Price, \$6.00.

EAST IS EAST AND WEST IS WEST. By Carlos E. Cummings. East Aurora, N. Y.: The Roycrofters, 1940. 382 pp. Price, \$3.50.

EXHIBITION TECHNIQUES. By R. P. Shaw. East Aurora, N. Y.: The Roycrofters, 1940. 131 pp. Price, \$2.00.

PNEUMONIA AND THE COMMON COLD. Club Talk Series, No. 3. Bulletin No. 35, January 10, 1941. New York: Public Relations Bureau, Medical Society of the State of New York. 6 pp.

COMMITTEE ON TESTS FOR INTOXICATION. 1940 Report to Street and Highway Traffic Section, National Safety Council. Chicago, Ill.: National Safety Council, 1941. 3 pp.

TWENTY-SECOND ANNUAL REPORT—1940. The Commonwealth Fund. New York: Commonwealth Fund, 1941. 73 pp.

## ASSOCIATION NEWS

### A.P.H.A. ATTITUDE TOWARD THE SCHWERT BILL

AT its meeting on December 20, 1940, the Executive Board considered Association policy with regard to bills then pending before Congress and related to health. The following resolution was adopted:

The Executive Board reaffirms the action of the Association taken October 17, 1939, in which it was declared that health services for school children are properly a part of the general health program of state and local health departments, a part which should be integrated with all other activities of these departments and participated in by the medical and allied professions. Because the program of health instruction and physical education is properly a function of departments of education, and because of the necessity that these health and educational services be coordinated, the Association in approving promotion of health by schools through health instruction urged that any expansion through increased federal appropriations which include health and medical services to children should be developed through agencies whose primary concern is with health.

In the opinion of the Executive Board, it is even more imperative now than a year ago that duplication and conflict in the administration of these plans should be avoided. If the time has come when a superstructure

of health education can be supported through federal subsidy, we believe that it should be built on a sound medical program and corrective service as a first step. The administration of such services must not be divorced from the school medical program and the public health departments where experienced medical leadership is most readily available.

While agreeing that the present is an appropriate time to consider the desirability of further federal aid toward health, physical education and medical care, it is our belief that legislation much more adequate for this purpose can be formulated than that presented through the Schwert Bill—H.R. 10606, although the objectives are generally desired and probably can be obtained through a plan which will recognize existing health agencies.

It was the sense of the Board that the Schwert Bill—H.R. 10606 should be considered to be in conflict with the general principle of integrated service and as not meeting the criteria of acceptability on which formal action by the Association has been taken.

(As the *Journal* goes to press a copy of a revised Bill (H.R. 1074) is received. The revision eliminates the health service feature of the former draft, limiting the Bill to physical education, health instruction, and recreation.)

## APPLICANTS FOR MEMBERSHIP

*The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.*

### Health Officers Section

Merrill L. Dawson, M.A., 1675 Ridgeway Place, Columbus, Ohio, State Supervisor, State-wide Health Project, National Youth Administration

Price H. Duff, M.D., Crossville, Tenn., Director, Upper Cumberland District Health Dept.

William B. Farris, M.D., Williamson County Health Unit, Franklin, Tenn., Director

Murland W. Fish, M.D., 203-24th St., Ogden, Utah, Deputy State Health Officer

Margaret E. Hatfield, M.D., Court House, Janesville, Wis., Medical Director, Rock County Sanitary Unit

Henry A. Holle, M.D., 853 U. S. Court House, Chicago, Ill., District Medical Consultant, U. S. Public Health Service

Edward C. Humphrey, M.D., Mercer County Health Dept., Harrodsburg, Ky., Director

Charles J. Larkey, M.D., 700 Avenue C,  
Bayonne, N. J., Health Officer

Harry F. Leeds, B.Sc., 30 Mt. Vernon Ave.,  
Pitman, N. J., Acting District Health  
Officer, Bureau of Local Health Adminis-  
tration, State Dept. of Health

Herbert S. Miller, M.D., P. O. Box 240,  
Owensville, Mo., District Health Officer,  
State Board of Health

Alfred C. Moore, M.D., City Health Dept.,  
Baltimore, Md., Administrative Health  
Officer

Henry R. Perkins, M.D., 150 Mooreland Ave.,  
Laurens, S. C., Director, Laurens County  
Health Dept.

Everett W. Ryan, M.D., Tallahatchie Co.  
Health Dept., Charleston, Miss., Director

Frank K. Sewell, M.D., M.P.H., Breathitt  
County Health Dept., Jackson, Ky.,  
Director

Alvin L. Waller, M.D., Hardin-Tyler Health  
Unit, Woodville, Tex., Director

John R. Wilkey, M.D., D.P.H., Board of  
Education, London, Ont., Canada, School  
Medical Officer

#### *Laboratory Section*

Professor Edward D. Davy, 2029 Adelbert  
Road, Cleveland, Ohio, Acting Dean, School  
of Pharmacy, Western Reserve University

Ella L. May, B.A., 1017 Tennessee Ave.,  
Albuquerque, N. M., Executive Assistant,  
State Public Health Laboratory

Lee H. Petersen, B.S., 145 W. Idaho, Boise,  
Ida., Junior Bacteriologist-Serologist, State  
Division of Public Health

Jesse P. Porch, D.V.M., District of Columbia  
Health Department, Washington, D. C.,  
Serologist and Assistant Director, Bureau  
of Laboratories

Luboff S. Senavsky, A.B., Box 57, Walnut  
Creek, Calif., Student of Public Health,  
University of California

Joseph K. Silberstein, M.S., 2314 Morris Ave.,  
Bronx, N. Y., Laboratory Assistant, Pneu-  
monia Division, New York City Dept. of  
Health

H. M. Sherman Watkins, 3-25th Ave., San  
Francisco, Calif., Student of Bacteriology  
and Public Health, University of California

#### *Vital Statistics Section*

Marion I. Kersey, B. of C., 250 Government  
St., Victoria, B. C., Canada, Statistician,  
Division of Vital Statistics, Provincial Board  
of Health

B. Alden Lillywhite, M.S., 4124 Edmunds St.,  
N.W., Washington, D. C., Associate Statis-  
tician, Division of Statistics, Work Projects  
Administration

#### *Engineering Section*

Ralph M. Chute, M.A.Sc., Box 789, Hatties-  
burg, Mass., Sanitary Supervisor, Forrest  
County Health Dept.

William B. Gaylord, Jr., Health Department,  
Windsor, N. C., Sanitary Officer, Bertie-  
Chowan District Health Dept.

Eugene L. Lehr, C.E., 15 Summit St., Man-  
chester, Conn., Housing Engineer, Bureau  
of Sanitary Engineering, State Dept. of  
Health

#### *Industrial Hygiene Section*

Roy S. Bonsib, A.M., E.M., Rm. 2430, 30  
Rockefeller Plaza, New York, N. Y., Chief  
Safety Inspector, Standard Oil Co. of New  
Jersey

David B. Dill, Ph.D., Soldiers Field Station,  
Boston, Mass., Professor of Industrial  
Physiology, Harvard University

Robert T. Homewood, M.S., State Health  
Dept., Richmond, Va., Engineer, Bureau of  
Industrial Hygiene

Waldemar J. Klasing, B.S. in C.E., 3197A  
Portis Ave., St. Louis, Mo., Industrial  
Hygiene Engineer, St. Louis Health Division

William E. McCormick, M.S., Willson Prod-  
ucts, Inc., Reading, Pa., Director, Industrial  
Hygiene Laboratory

Stewart H. Webster, Ph.D., National Institute  
of Health, Bethesda, Md., Biochemist,  
Division of Industrial Hygiene

#### *Food and Nutrition Section*

Alice Biester, A.M., Div. of Home Econ.,  
University of Minnesota, St. Paul, Minn.,  
Associate Professor of Nutrition

Louis A. Harriman, Ph.D., Armour & Co.,  
Union Stock Yards, Chicago, Ill., Chemical  
Research Department

#### *Maternal and Child Health Section*

M. Robert de Romeu, M.D., Park St., 91,  
Santurce, P. R., Chief, Bureau of Maternal  
and Infant Hygiene, Dept. of Health

Coleman M. Young, M.D., C.P.H., 818 S.  
Sixth St., Louisville, Ky., Assistant Health  
Director, Louisville Health Dept.

#### *Public Health Education Section*

Etta A. Creech, A.M., 2525 Euclid Ave.,  
Cleveland, Ohio, Director, Family Health  
Association

Sula Fleeman, 207 Majestic Bldg., Fort Worth,  
Tex., Executive Secretary, Fort Worth-  
Tarrant County Tuberculosis Society

Laura V. Geddes, R.N., Sudbrook Park,  
Pikesville, Md., Staff Nurse, Baltimore  
County Health Dept.

Elizabeth F. Jordan, Ph.D., 1790 Broadway,

New York, N. Y., Staff Member, National Tuberculosis Association

Margaret J. Maleady, B.S., 2979 Marion Ave., New York, N. Y., Bronx Borough Adviser, Henry St. Visiting Nurse Service  
 Harriet I. Pickens, A.B., 260 West 139 St., New York, N. Y., Executive Secretary, Harlem Tuberculosis and Health Committee, New York Tuberculosis and Health Assn.

Bessie L. Rice, R.N., B.A., 79 Horatio St., New York, N. Y., Supervisor of Nursing, Judson Health Center

Ruth A. Thomas, A.B., C.P.H., Morris House, Northampton, Mass., Assistant Professor of Hygiene, Smith College.

#### *Public Health Nursing Section*

Elinor L. Beebe, R.N., Ph.D., University of California, 405 Hilgard Ave., W. Los Angeles, Calif., Assistant Professor of Public Health Nursing

Geneva E. Hunter, P. O. Box 185, Wagon Mound, N. M., County Nurse

Janet Jennings, R.N., M.A., 1336 Newberry Ave., Chicago, Ill., Director of Nursing, Chicago Maternity Center

Faye A. Tuttle, 808 So. Peoria, Tulsa, Okla., Supervisor, Public Health Association, Inc.

Judith E. Wallin, R.N., 1624 Louisiana Ave., New Orleans, La., Local Field Supervisor, Metropolitan Life Insurance Co.

Helen W. Lukens, B.S., 818-13th Ave., Prospect Park, Pa., Public Health Nursing Instructor, Mt. Sinai Hospital, Philadelphia

#### *Epidemiology Section*

Harold L. Israel, M.D., Henry Phipps Inst., 7 & Lombard Sts., Philadelphia, Pa., Instructor in Medicine

Dr. Alberto P. Ros, Almendares 4 bajos Esq. Carlos III, Havana, Cuba, Field Director, Malaria Commission of Cuba

Margaret E. Tharp, A.B., 127 Athol Avenue, Oakland, Calif., Junior Public Health Analyst, State Dept. of Health

#### DECEASED MEMBERS

Floyd J. Atwell, M.D., Cooperstown, N. Y., Elected Member 1926

Arthur W. P. Blohm, Baltimore, Md., Elected Member 1932

William B. Furman, M.D., Pickens, S. C., Elected Member 1936

Charles F. Glueck, Boston, Mass., Elected Member 1923, Elected Fellow 1929

Margaret H. Hand, R.N., Binghamton, N. Y., Elected Member 1930

William O. Hewitt, M.D., Attleboro, Mass., Elected Member 1923

George D. Lummis, M.D., Middletown, Ohio, Elected Member 1916, Elected Fellow 1922

Allan L. McLean, M.D., C.P.H., Halifax, N. S., Canada, Elected Member 1937

#### A.P.H.A. DIRECTORY OF PERSONS ENGAGED IN VITAL STATISTICS

THE Vital Statistics Section officers, in coöperation with the central office staff, have prepared and published a Directory of persons engaged in vital statistics work in the United States and Canada. This, the second edition of the Directory, contains 832 names and includes the federal, state, and local services and private organizations. The preceding Directory published in 1935 contained only 498 names. Included in the new Directory are the names of 351 members and Fellows of the American Public Health Association.

The effort has been made to have each name and title accurate and to this

end each listing was submitted to the person concerned before publication.

Besides serving as a useful directory for this special field, the publication is directly serviceable to the Association because it serves to increase membership (at least 47 new members to date), and further identifies the Association with useful services to the membership. Other Sections are considering similar directories.

This Directory was prepared with the help of Jessamine S. Whitney and Dr. John Collinson of the Section, by Elsie A. Siemer, Beatrice Schott, and Helen Baum, of the Association staff.

## EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

### POSITIONS WANTED

#### ADMINISTRATIVE

Physician, aged 39, excellent graduate training and experience in public health, specialized in tuberculosis and epidemiology, now employed, will consider position with salary of \$4,500 or better. A473

Experienced physician, graduate University of Illinois; M.P.H., Johns Hopkins, 1940; seeks administrative opening suitable to his proven ability. Excellent references. A466

Physician, aged 38, M.P.H., Harvard, 1932; experienced as director of county units and in state department of health; will consider administrative position. A474

Physician, graduate University of Iowa, candidate for Dr.P.H. at Harvard, seeks good administrative position. A476

Physician, M.D., Yale; M.S.P.H., Columbia; also short course for health officers, Vanderbilt; good clinical background; 3 years' public health experience; will consider appointment in child health, epidemiology or public health administration. A350

Physician, graduate Columbia, 1919; Dr.P.H., Yale, 1938; specializing in child hygiene; experienced with community surveys; will consider administrative position or opportunity in child hygiene. A475

Experienced physician with A.B. and M.D. from University of Pennsylvania, and M.P.H. from Yale, desires full-time position as health officer. Will consider going abroad with relief expedition to Europe or Asia. A477

#### HEALTH EDUCATION

Young woman, Ph.D., Columbia University; splendid background of experience in health education, will consider position as director of public health education. H294

Well qualified woman physician, M.A. and M.D. from Stanford; with 6 years' experience in nationally known secondary school in health education and medical advisory duties, wishes position in college health work. H448

Health educator, with excellent background of teaching experience in schools; M.S.P.H., University of Michigan; wishes position where skill with educational sound film projection and other recognized technics will be appreciated. H405

#### LABORATORY

Teaching, executive or administrative position desired by experienced teacher in bacteriology and public health; Ph.D., Cornell; now professor in grade A medical school. L327

Experienced woman bacteriologist, Ph. D., University of Illinois, 1937, wishes position in teaching or research. Excellent bibliography and references. L410

#### SANITARY ENGINEERING

Engineer, aged 38, 3 years' experience as district sanitarian supervisor, state department of health, together with work on plumbing, heating, and ventilation, will consider position in the plumbing and heating field or state department of health. Prefers middle western or western states. E453

Public health engineer, B.S. in Sanitary Engineering from Massachusetts Institute of Technology, experienced in Massachusetts, Connecticut, and Kentucky, seeks position as sanitary or public health engineer with health department. E380

Engineer with good training and experience in water treatment, sewage plant operation and in research, wishes position as superintendent. Can go anywhere. E422

### Advertisement

## Situations Wanted

**PUBLIC HEALTH PHYSICIAN**—B.S. and M.D. degrees state university, M.P.H. Johns Hopkins; 4 years, director of county health unit; recommended as a highly skilled man in the field of public health theory and administration; for further information write Burnice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

**PUBLIC HEALTH NURSE**—Graduate of one of

country's leading schools of nursing, B.S. degree, state university, with major in public health nursing; 8 years' experience in tuberculosis and public health nursing; served as director of visiting nurses association for several years; taught in public schools before entering training school; age 36; will go anywhere; for further information write Burnice Larson, Director, Medical Bureau, Palmolive Building, Chicago.



## Advertisement

## Opportunities Available

**PUBLIC HEALTH PHYSICIAN**—With minimum 3 years' postgraduate study in obstetrics for state health appointment; organizing and directing ability essential; interesting opportunity. PH2-1, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**COUNTY HEALTH PHYSICIANS**—(a) Rural health appointment under state department of health; man from South or West preferred. (b) Montana; opportunity to combine duties as county health physician at salary of \$200 a month with private practice which will bring estimated annual income of \$5,000; ranching district. (c) Physician with public health training to serve as commissioner of health; rural county; \$3,000 plus \$600 travel allowance. PH2-2, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**CITY HEALTH PHYSICIANS**—(a) Director of public health to assume full charge in city of 10,000; may select own personnel; no politics; \$4,000-\$5,000, increasing; Atlantic Seaboard. (b) Young physician qualified to plan full-time public health program for city of 5,000; Ohio. (c) Young married physician for general practice in connection with municipal health department; Virgin Islands; \$2,400. PH2-3, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH PHYSICIANS**—(a) For full-time state appointment; must have public health certificate from recognized school, plus actual field experience; man under 40 preferred; \$4,200 plus \$500 automobile allowance. (b) District health physician; Master's degree in public health, experience in rural health work required; \$4,200 plus \$600 travel allowance; Midwest. PH2-4, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**STUDENT HEALTH PHYSICIANS**—(a) Four year appointment beginning September, 1941; opportunity for graduate work in Public Health or other specialty leading to Master's degree; annual salary increase. (b) For two year fellowship, eastern university; some teaching; first year, \$1,500; maintenance; second year, \$1,725, maintenance, or \$2,250 without maintenance; September, 1941, to June, 1942. (c) Residence in student health service; mid-southern university; recent graduates eligible; \$100, maintenance. PH2-5, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSE EXECUTIVES**—(a) Educational director and consultant in division

maternal and child health; \$200, plus travel allowance; West. (b) Instructor in public health; school of nursing affiliated with midwestern university. (c) Public health instructor; Catholic preferred; 600 bed hospital; East. (d) Public health nursing supervisor; responsibility covers generalized program including school and delivery service; degree desirable but not essential; \$175, plus travel allowance. PH2-6, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSES**—(a) County health department; minimum 13 credits in public health nursing required; \$1,500, plus \$300 automobile allowance; midwest. (b) About twelve staff nurses; state public health nursing service; West. (c) Several; state health program; Deep South. (d) City health department; program includes all school nursing and maternity center; eighteen nurses on staff; one immediate vacancy, several in prospect; \$125-\$150; minimum 4 months' accredited course in public health nursing required. (e) County health department; duties include school nursing; Florida. (f) State department of health; certified public health nurse required; \$135, mileage allowance; Far West. (g) Public health nurse with some training or experience in social service; large children's hospital. PH2-7, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSE**—Young woman with B.S. degree and public health training and experience qualified to integrate public health nursing in school program for colored unit of large training school; must be familiar with schools of nursing programs; unusual opportunity. PH2-8, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**OUTPATIENT DEPARTMENT SUPERVISORS**—(a) Graduate nurse with public health training to serve as outpatient department supervisor, small community hospital; ability in organization desirable; \$100, meals, \$12 room allowance. (b) Certified public health nurse to take charge small outpatient department and central dressing room; 250 bed hospital; vicinity Nation's Capital. PH2-9, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**CITY BACTERIOLOGIST**—One year appointment in city of 65,000; work will include milk and water analysis; some chemistry; bacteriology or chemistry major preferred; \$150. PH2-10, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

## Advertisement

**PUBLIC HEALTH NURSING OPPORTUNITIES**—(A) Medical Social Worker; nurse with degree in sociology or public health; attractive middle western hospital opening; \$150 monthly. (B) Chief Registrar; large nurses' organization seeking college woman with pleasing personality; \$150, increase later. (C) Social Worker; southern hospital, large university town; salary

open. (D) Staff Nurse; progressive middle western city, requiring public health training; salary above average. (E) Supervisor of Nurses; requires public health certificate, speaking ability; attractive salary, travelling allowance, opportunity increase. (F) Public Health Nurse; middle western industrial city near Chicago; salary open. PH-1, Aznoe's Central Registry, 30 North Michigan, Chicago.

## NEWS FROM THE FIELD

### AMERICAN COMMISSION TO STUDY HEALTH CONDITIONS IN EUROPE

**A**N American commission to study health conditions in Europe, including epidemic control and the evacuation of children, left New York January 18 on the SS. Excalibur for Lisbon. The commission includes Dr. Thomas Parran, Surgeon General of the Public Health Service, Dr. Martha Eliot, Assistant Chief of the Children's Bureau, Major Eugene W. Ridings, of the War Department General Staff, and F. C. Horner, Transportation Consultant to the Defense Commission.

According to the press, Dr. Parran stated that the Commission would try to find out what happens to civilian populations, hospital and sanitation facilities, schools and education, transportation and other public utilities under constant bombing.

### PLAN TO ERADICATE TUBERCULOSIS

**T**HE appointment has been announced of a coördinating committee which has chosen as its goal the elimination of tuberculosis as an important cause of death by 1960 in upstate New York. Represented on the committee, beside Edward S. Godfrey, Jr., M.D., New York State Commissioner of Health, and members of the State Health Department, are: William J. Tiffany, M.D., State Commissioner of Mental Hygiene; David C. Adie, State Commissioner of Social Welfare; Dr. Peter Irving, Secretary, Medical Society of the State of New York; Homer Folks, Secretary, George J. Nelbach, Assistant Secretary, and Robert W. Osborne of the State Charities Aid Association, and Donald B. Armstrong, M.D., Vice President of the Metropolitan Life Insurance Company, which is financing the program of the coördinating committee.

Describing the success of a similar co-ordinating effort with reference to diphtheria, which began fifteen years ago, Dr. Godfrey expressed the opinion that the same method could be made effective with tuberculosis. Although the rate has declined since 1907 from more than 150 per 100,000 population to 36 in 1939, it is still possible to accomplish more through a coöperative effort in order that the money and effort now required for the treatment of the disease can be diverted to other needs which every year become more pressing. Dr. Armstrong emphasized the importance of the problem to the insurance company because the disease costs the company annually in death claims more than seven million dollars.

### MEDICAL CARE QUARTERLY

**A** NEW journal, *Medical Care* (a quarterly), appeared January 21 under the auspices of the Committee on Research in Medical Economics, Inc., 1790 Broadway, New York, N. Y., with Michael M. Davis, Ph.D., Chairman of the committee, as its editor. Its stated purposes are to disseminate information concerning the economic and social aspects of medicine, to promote a scientific approach to the subject, and to stimulate practical action by the professions and the public in their common interest. The views and interests of the professions that furnish medical care and the people who receive it are equally to be considered.

The first issue contains, among other articles, a review of what 24 state medical societies have done during 1940 concerning voluntary health insurance plans. The journal has a group of 45 Editorial Advisers, representing the medical and allied professions, social scientists, public administrators, and representatives of the general public interest.

#### ARMY MEDICAL LIBRARY WISHES REPRINTS

**A**N announcement from the Army Medical Library, Washington, D. C., by Col. Harold W. Jones, Librarian, states that the Army Medical Library is glad to have reprints of articles sent by authors. All such reprints are placed in a special collection and are catalogued by the name of the author. Thus they form a ready bibliography of the work of any given writer and a valuable supplementary source of material when the original volume of publication is temporarily unavailable at the bindery or on loan. Authors would do well to send two reprints of each of their writings to the Army Medical Library for this purpose.

#### NURSES ON LEAVE FOR MILITARY SERVICE

**A**T the request of Dr. G. C. Dunham, Executive Secretary of the Health and Medical Committee functioning under the United States Coördinator of Health, Welfare and Related Defense Activities, the following recommendation of the Subcommittee on Nursing is published for the information of our readers:

It is suggested that organizations employing nurses who volunteer and are accepted for assignment to active service in military establishments give such nurses one year's leave of absence without change of status.

#### MEXICO REORGANIZES HEALTH DEPARTMENT

**T**HE Federal Department of Health in Mexico has been reorganized under the new administration with Dr. Victor Fernandez Manero, Chief of the Federal Department of Health, Dr. Mario Quinones, Secretary General, and Luis Babadilla in charge of the office.

Dr. Angel de la Garza Brito continues as Dean of the School of Public Health and Hygiene in Mexico City.

#### CUBAN PHYSICIANS VISIT NEW YORK

**A** GROUP of five Cuban physicians from Havana visited New York City in January for conferences with the Dean and staff of the Cornell University Medical College, and in connection with a plan for the exchange of graduate students between the University of Havana and Cornell University.

The group consisted of Dr. Carlos E. Finlay, Vice-President of the American Public Health Association; Dr. Felix Hurtado, Undersecretary of Health, Cuba; Dr. Alberto Inclan; Dr. Angel Vieta, Dean of the Medical Faculty of the University of Havana; and Dr. Alfredo Antonetti.

#### INDUSTRIAL PUBLIC HEALTH NURSING SERVICES SYMPOSIUM

**A** SYMPOSIUM on Industrial Public Health Nursing Services, sponsored by the State Board of Health and the Industrial Nurses of Wisconsin, will be held February 20-22, at the Hotel Wisconsin, Milwaukee, Wis.

Agencies coöperating include the following:

- Wisconsin State Nurses Association
- Wisconsin State Medical Society
- University of Wisconsin
- Wisconsin Industrial Commission
- Wisconsin Association of Manufacturers
- Marquette University
- Wisconsin Anti-Tuberculosis Association
- Milwaukee City Health Department
- Milwaukee Association of Commerce
- Industrial Relations Association
- Employers Mutual Liability Insurance Company of Wisconsin

#### UNIVERSITY OF MINNESOTA FELLOWSHIPS, 1941-1942

**T**HE University of Minnesota has announced a number of in-service fellowships in Public Administration for the academic year 1941-1942. The period of training will extend from the beginning of the fall term through the winter and spring quarters and the first

term of the summer session. Individual courses of study will be planned for each student, depending upon previous preparation, personal interests, and the requirements of public service. These in-service fellowships will carry stipends varying in amount from \$1,000 to \$1,500 a year, depending upon the student's experience, his present salary, and the number of his dependents.

Applicants for these fellowships must be citizens of the United States, not over 35 years of age, graduates of recognized universities and colleges, and must qualify for admission to the Graduate School of the University of Minnesota. They must have not less than 3 years of experience in public service, preferably in a position involving some administrative responsibility. Each applicant must be endorsed by his governmental employer, and he should secure promise of a leave of absence for the duration of his fellowship year.

Applications must be submitted not later than April 1, 1941. Requests for application blanks and further information should be addressed to the Secretary of the Committee on Training for Public Administration, 13 University Library, University of Minnesota, Minneapolis, Minn.

#### NATIONAL DENTAL HYGIENE ASSOCIATION

THE formation of the National Dental Hygiene Association, Incorporated, with offices in Washington, D. C., was recently announced. Randolph G. Bishop, of the Washington, D. C., Community Chest, has been appointed Executive Secretary.

The association will publish approved educational material for lay consumption, encourage dental research and stimulate generally a broader understanding of the basic relationship of dental care to the health needs of the country. It is hoped that lay support and lay participation in the field of den-

tal health will be encouraged. The association has been founded as a memorial to William Henry Hall through a gift from the Martha M. Hall Foundation of New York City.

#### NURSING SERVICES BUILDING DEDICATED IN HAWAII

THE Mabel Smyth Memorial Building, in Honolulu, providing offices for the Nurses Association of the Territory of Hawaii and the City and County of Honolulu, the Board of Nursing Registration, the Nursing Service Bureau and the Physicians' Exchange, was dedicated January 4.

The building was erected from funds contributed by doctors, nurses, interested individuals and business firms throughout the Territory of Hawaii to provide medical library facilities and headquarters for the official nursing and medical organizations.

#### NATIONAL DEFENSE ACTIVITIES

THE U. S. Public Health Service has been designated a national defense agency. The Division of Industrial Hygiene is preparing to assist in the prevention and control of health hazards in Government arsenals and navy yards. Surgeon General Thomas Parran has authorized the Chief of the Division of Industrial Hygiene to employ additional personnel for the purpose of organizing industrial hygiene programs and training personnel within these military establishments to carry out the programs.

The Surgeon General has also authorized the Division of Industrial Hygiene to assign several units, each unit consisting of a doctor and an engineer, to cooperate with State industrial hygiene units in giving special attention to airplane and munitions plants, and to shipyards. The Vermont unit is now receiving assistance in the investigation of health problems which have arisen in the machine tool in-

dustry as a result of inadequate housing, long hours of work, and certain foundry hazards.

It is hoped that there will be a sufficient number of such units to aid other States with their most acute problems in defense industries. State industrial hygiene units are urged to inform the Division of Industrial Hygiene of their most immediate defense problems and to make any suggestions which they feel may be helpful to other units.

### PERSONALS

#### Central States

ASA S. BACON † has retired as Superintendent of Presbyterian Hospital, Chicago, Ill., after 40 years of service at the Hospital, as of January 1, 1941. He will be succeeded by J. DEWEY LUTES, who has been Superintendent of Ravenswood Hospital for the last 9½ years.

EDWARD BARTOW, PH.D.,\* Professor and Head of the Department of Chemistry and Chemical Engineering at the University of Iowa, Iowa City, Ia., has been granted a leave of absence to join the research laboratories of the Johns-Manville Corporation, at Manville, N. J.

DR. CHARLES C. CROSBY, of Ashtabula, Ohio, has been appointed Health Officer of Ashtabula County, succeeding DR. JONAS L. HURST, of Dorset.

ROLAND R. CROSS, M.D.,† of Dahlgren, Ill., Assistant Director, State Department of Health, has been named Acting Health Director.

DR. LOUIS N. DAKIL, of Mayetta, Kan., has been appointed Physician of the Quapaw Indian Agency, with headquarters in Miami, succeeding DR. JOSEPH H. COOGAN, transferred to an agency in Nevada.

DR. CHARLES A. DIETER, of Harper, Kans., has been appointed Health Officer in charge of Harper County, to succeed the late DR. CLARENCE E. RESSLER, of Anthony.

DR. GEORGE R. DOUGLAS, of Valparaiso, Ind., has been appointed Health Officer of Porter County, filling the vacancy caused by the death of DR. HERMAN O. SEIPEL.

DR. C. MILTON EBERHART, formerly District Health Superintendent in the Illinois Department of Public Health, Springfield, has been appointed Vice-Chairman of the Department of Preventive Medicine, Public Health and Bacteriology of Loyola University School of Medicine.

DR. LAWRENCE E. FOSTER, formerly of Monticello, Ill., has been appointed head of a new health unit in Jefferson County, with headquarters in Port Townsend, Wash.

DR. JOHN WILLARD HANSON, Medical Fellow in Pediatrics, University of Minnesota Hospitals, Minneapolis, Minn., has accepted a position in the Health Service of the University of Kansas, Lawrence, effective September 1.

DR. JAMES N. HILL, of Hutchinson, Kans., has been appointed Health Officer of Reno County.

LORIN E. KERR, JR., M.D.,† of Toledo, Mich., has been appointed Director of the Iron County Health Department, succeeding THOMAS E. CAMPER, M.D.,† who is on leave of absence for graduate study at the University of Michigan.

CORNELIUS E. KLINE, M.D., formerly of Vienna, has been appointed in charge of the Moline District Health Unit, succeeding CARL A. PETERSON, M.D.,† of Moline, Ill., who resigned because of ill health.

DR. GEORGE W. MORROW, Managing Director of the Kankakee State Hospital, has been named Acting Direc-

† Member A.P.H.A.

\* Fellow A.P.H.A.

tor of Public Welfare, of the Illinois State Department of Health.

DR. CASIMIR PARK, of Milwaukee, Wis., has been appointed Venereal Disease Control Officer for the City and County of Milwaukee, effective January 2, 1941. He serves under the direction of DR. EDWARD R. KRUMBIEGEL,† City Health Officer.

ERIC P. PFEIFFER, M.D., C.P.H.,† formerly of Oakville, Ia., has been appointed Director of the Vital Statistics Division of the State Department of Health, effective October 1.

BUEL H. VAN LEUVEN, M.D.,† of Petoskey, Mich., has been named Health Officer of Menominee County, to succeed CLIFFORD C. CORKILL, M.D.,† who is studying at the Johns Hopkins University School of Hygiene and Public Health, Baltimore.

### Eastern States

LEONA BAUMGARTNER, M.D., PH.D.,\* who has been District Health Officer in the Kips Bay-Yorkville Health Center of the New York City Department of Health, has been appointed Acting Director of the Bureau of Child Hygiene of the Department of Health, New York City. Dr. Baumgartner is Associate Editor of the *American Journal of Public Health*.

BERNARD M. BLUM, M.D., M.P.H.,\* recently Epidemiologist of the Division of Communicable Diseases, New York State Department of Health, Albany, has been appointed District Health Officer of the Washington Heights-Riverside Health District of the New York City Department of Health, where he also assumes teaching responsibilities in the Delamar Institute of Public Health, Columbia University. He succeeds JACOB H. LANDES, M.D.,† who is transferred as District Health Officer to the Williamsburg-Greenpoint Health Center, Brooklyn.

DR. REX E. BUXTON, of Boston, Mass., has been appointed Director of the Washington Institute of Mental Hygiene, Washington, D. C., succeeding DR. PAUL J. EWERHARDT, resigned.

DR. JERAULD A. CAMPBELL, of Niagara Falls, N. Y., has been appointed Health Officer of Grayson County, Ky.

DR. HAZEN A. CALHOUN, JR., of Middletown, Conn., has been appointed Health Officer of Haddam, succeeding DR. NOAH A. BURR.

HILARY J. CONNOR, M.D.,† of Providence, R. I., has been appointed Director of a new Department for Venereal Disease Control in the State Health Department.

FRANKLIN M. FOOTE, M.D., DR.P.H.,\* recently chief of the Division of Local Health Administration of the Connecticut State Department of Health, Hartford, has been appointed District Health Officer in the Kips Bay-Yorkville Health District, New York, N. Y., where he is also instructor of Public Health at Cornell University Medical College. Dr. Foote succeeds DR. LEONA BAUMGARTNER,\* who has been appointed Acting Director of the Bureau of Child Hygiene of the New York City Department of Health.

ALEXANDER D. LANGMUIR, M.D.,† of Albany, N. Y., has been appointed Deputy Commissioner of the Westchester County [New York] Department of Health, effective February 1. He will have an office in Peekskill, and be in charge of the northern section of the County. Dr. Langmuir is a graduate of the Cornell University Medical School and has a Master of Public Health degree from Johns Hopkins University. For the past 3 years he has been with the New York State Department of Health in

\* Fellow A.P.H.A.

† Member A.P.H.A.

special work on pneumonia and as Assistant District Health Officer.

ERNEST M. MORRIS, M.D., C.P.H.,\* has been appointed Health Officer of Newton, Mass.

ROBERT V. SCHULTZ, M.D.,† of New York, N. Y., has been named Director of Public Health Education for the Georgia State Department of Health.

GEORGE M. WHEATLEY, M.D.,† has been appointed Assistant Medical Director of the Metropolitan Life Insurance Company, of New York, effective January 1. He has recently served as Director of the School Health Service of the New York City Department of Health, and was formerly connected with the School Health Study program in New York City. Dr. Wheatley's responsibility will be primarily with relationships between the Welfare Division and medical societies, preventive medical movements, and health services.

#### Southern States

CHARLES D. BOWDOIN, M.D., C.P.H.,† of Atlanta, Ga., Director of the Division of Preventable Diseases, State Department of Public Health, has been appointed Special Consultant for the U. S. Public Health Service by DR. THOMAS PARRAN, Surgeon General of the Service.

EDWARD ROSS DAVIES, M.D.,† of Ellicott City, Md., formerly Health Officer of Howard County, has been appointed Assistant Commissioner of Health of Baltimore, effective September 18, to succeed WILLIAM H. F. WARTHEN, M.D.,\* who is now Health Officer of Baltimore County.

DR. NICHOLAS H. DEJANNEY, of Detroit, Ala., has been appointed a member of the tuberculosis staff of the Alabama State Department of Health.

DOUGLAS H. FRYER, M.D., D.P.H.,† former Health Officer of Greene County, Ala., has been appointed Director of the Rockingham County Health Department, which is being organized for the first time with the main office located at Leaksville, N. C., and branch offices at Reidsville and Madison, N. C.

DR. CHARLES W. HARWELL, Assistant Professor of Anatomy, Emory University School of Medicine, Atlanta, Ga., has resigned, to become a Fellow in Public Health at the University of North Carolina.

ALLAN J. JERVEY, JR., M.D., of Tryon, N. C., has been appointed District Health Officer for Rutherford and Polk Counties, to succeed DR. HAROLD C. WHIMS, M.D., C.P.H.,† of Rutherfordton, who was recently transferred to the Lincoln-Catawba District.

JAMES JOHNSON, Dairy and Food Inspector of the Arlington County Virginia Health Department, has reported for active duty to the Chemical Warfare Division of the U. S. Army Camp Holobaird, Virginia.

JOSEPH A. JOHNSON, M.D.,† of Greensboro, Ga., has resigned as head of the Greene County Health Unit, effective November 1, to accept a similar position at Toccoa in charge of the unit including Stephens, Habersham, and Rabun Counties.

MRS. VIRGINIA O'DELL, Director of Nurses, Arlington County, Va., will receive her Certificate in Public Health Nursing from William and Mary College, School of Public Health Nursing, in February.

MAXWELL F. RAINE, M.D., of Point Pleasant, W. Va., District Health Officer for Mason, Jackson, Putnam and Roane Counties, has been appointed Health Officer of Kanawha County, to succeed TURNER E. CATO, M.D.,† who recently went to Miami, Florida.

\* Fellow A.P.H.A.

† Member A.P.H.A.

DR. JOHN L. RUFF, formerly of St. Paul, Ark., has been appointed Medical Director for Crawford, Franklin, and Logan Counties, succeeding Dr. ALBERT S. J. CLARKE, of Ozark, who plans to enter the School of Public Health at Harvard University.

MARGARET SCOTT, R.N., Public Health Nurse with the Glynn County, Ga., Health Department, was granted a Certificate from the Peabody School of Public Health Nursing, January 1.

THERESE STAFFORD, R.N., Staff Nurse with the Glynn County, Ga., Health Department, has been granted a 6 months leave of absence, to attend the Medical College of Virginia School of Public Health Nursing.

DR. JOHN D. STILLWELL, of McRae, Ga., has been named Director of the Southeastern Region of the State Department of Public Health, which covers 26 counties. He will have headquarters in Waycross, succeeding Dr. BERT H. MALONE, resigned.

WILLIAM CARROLL SUMMER, M.D.,† of Minden, La., Director of the Webster Parish Health Unit for the past 10 years, has resigned to become Consultant Adviser to the parish health units in 18 parishes of northern Louisiana. He will be succeeded by EDMOND G. KLAMKE, M.D., of New Roads, Health Director of Pointe Coupee Parish.

JAMES A. THRASH, M.D.,† Health Officer of Columbus and of Muscogee County, Ga., has been granted leave of absence until June, 1941, to take special studies in health work at the University of North Carolina School of Medicine, Chapel Hill.

JOHN M. WHITNEY, M.D.,† of Jennings, La., head of the Jefferson Davis Parish Health Unit, has been made Director of 15 parish health units in southwestern Louisiana; the area runs from the Texas line to Terrebonne Parish on the south and to Pointe Coupee Parish on the north.

### Western States

DR. ALEXANDER BRADFELD, of Tillamook, Ore., has been appointed Health Officer of Tillamook County.

RUTH W. HAY,† for the past 4 years Assistant Professor of Public Health Nursing in the Department of Hygiene at the University of California, Berkeley, has been appointed Professor of Public Health Nursing in the School of Public Health of the University of North Carolina. Miss Hay will assume her position at Chapel Hill in the spring, and courses in public health nursing will be offered beginning in the fall of 1941. The Department of Public Health Nursing will be an integral part of the School of Public Health, and coöperation will be maintained with rural, state, city, government and other agencies.

DR. JOHN R. SEELEY, formerly of Fresno, Calif., has been appointed Health Officer of Coos County.

DR. LEE A. STONE,\* of Madera, Calif., was elected President of the Health Officers' Department of the League of California Cities at a meeting held September 18 in San Diego.

### Philippine Islands

DR. MARIANO C. ICASIANO was recently appointed Health Officer of Manila, in connection with the establishment of a new City Department of Health and Welfare.

### DEATHS

GEORGE D. LUMMIS, M.D.,\* Health Officer of Middletown, Ohio, aged 77, died December 26, 1940, after more than 50 years as Health Officer of Middletown. For 22 years he was a member of the Ohio State Board of Health and at his death was President of the International Society of Medical Health Officers. Dr. Lummis

\* Fellow A.P.H.A.

† Member A.P.H.A.



joined the American Public Health Association in 1916 and was a Charter Fellow. At the time of his death he was a member of the Governing Council and representative from the Health Officers Section on the Committee on Eligibility.

E. M. MORELAND, Sanitary Inspector for the past 10 years in the Arling-

ton County, Va., Health Department, died December 30, 1940.

W. L. STEVENSON,\* Sanitary Engineer of Harrisburg, Pa., died January 4. He was Director of the Bureau of Engineering of the Pennsylvania Department of Health.

\* Fellow A.P.H.A.

## CONFERENCES AND DATES

- American Association for Social Security. New York, N. Y. March 28-29.
- American Camping Association — 18th Annual Convention. Wardman-Park Hotel, Washington, D. C. February 13-15.
- American College of Physicians—25th Annual Session. Statler Hotel, Boston, Mass. April 21-25.
- American Library Association. Annual Meeting. Boston, Mass. June 19-25.
- American Medical Association — 92nd Annual Meeting. Cleveland, Ohio. June 2-6.
- American Orthopsychiatric Association — 18th Annual Meeting. Theme: Behavior and Its Disorders. Hotel Pennsylvania, New York, N. Y. February 20-22.
- American Public Health Association — 70th Annual Meeting. Convention Hall, Atlantic City, N. J. October 14-17.
- American Society of Civil Engineers — Spring Meeting. Baltimore, Md. April 23-26.
- American Society of Heating and Ventilating Engineers — Summer Meeting. San Francisco, Calif. June 16-20.
- American Society of Planning Officials. Winter Discussion Conference, Chicago, Ill. February 13-14. National Conference on Planning, in cooperation with American Institute of Planners, American Planning and Civic Association, National Economic and Social Planning Association. Philadelphia, Pa. May 11-14.
- American Water Works Association—61st Annual Convention. Royal York Hotel, Toronto, Ont., Canada. June 22-26.
- New Jersey Section—Roger Smith Hotel, New Brunswick, N. J. February 19.
- New York Section—Syracuse, N. Y. March 27-28.
- Indiana Section—Indianapolis, Ind. April 24-25.
- Illinois Section — Lincoln Douglas Hotel, Quincy, Ill. April 28-30.
- Pacific Northwest Section—Seattle, Wash. May 8-10.
- Southeastern Section — Charleston, S. C. May 12-14.
- Ohio Section—Cincinnati, Ohio. May 15-16.
- Michigan Section — Grand Rapids, Mich. September 24-26.
- Southwest Section—Fort Worth, Tex. October 13-16.
- California Section — Fresno, Calif. October 22-25.
- Four States Section—Baltimore, Md. November 6-7.
- Arizona Sewage & Waterworks Association—16th Annual Meeting. Yuma, Ariz. March 21-23.
- Child Welfare League of America—Midwest Regional Conference. Chicago, Ill. April 17-19.

- Civil Service Assembly—Eastern Regional Meeting. Washington, D.C. Third week in May. Central Regional Meeting, probably May.
- Colorado Public Health Association. La Junta, Colo. May.
- Conference of State and Territorial Health Officers of North America. Washington, D. C. Tentative date: Week of April 28.
- Florida Public Health Association. Orlando, Fla. December, 1941.
- Group Health Federation of America—Third Annual Convention. Los Angeles, Calif. June.
- Heating, Piping & Air Conditioning Contractors National Association. San Francisco, Calif. June 16–20.
- Idaho Public Health Association. Lewiston, Ida. October 6–7.
- Industrial Public Health Nursing Services Symposium. Hotel Wisconsin, Milwaukee, Wis. February 20–22.
- Medical Education and Licensure—Annual Congress. Chicago, Ill. February 17–18.
- Michigan Public Health Association. Grand Rapids, Mich. November 12–14.
- Missouri Public Health Association. St. Louis, Mo. April.
- National Association of Housing Officials. Cincinnati, Ohio. April 16–19.
- National Society for Crippled Children—8th Annual Seal Sale. March 21–April 13.
- New England Conference on Tomorrow's Children—Second. Littauer Center, Harvard University, Cambridge, Mass. July 16–18.
- New Mexico Public Health Association. Gallup, N. M. October.
- New York City Social Hygiene Week—sponsored by Bureau of Social Hygiene, Department of Health of New York City, in coöperation with the New York State Department of Health, and the U. S. Public Health Service. Meetings being held in Auditorium, Health Department Building, 125 Worth Street, New York, N. Y., during the week.
- Ohio Federation of Public Health Officials. Columbus, Ohio. May 23.
- Pacific Heating and Air Conditioning Exposition. Exposition Auditorium, Civic Center, San Francisco, Calif. June 16–20.
- Pennsylvania Public Health Association. Wilkes-Barre, Pa. May 28.
- Regional Conference on Social Hygiene. Under auspices of: Social Hygiene Committee, New York Tuberculosis and Health Association, and Eighty-eight Sponsoring Organizations. Hotel Astor, New York, N. Y. February 5.
- Smoke Prevention Association of America, Inc.—35th Annual Convention. Ansley Hotel, Atlanta, Ga. June 3–6.
- Social Hygiene Day—Fifth National—February 5. (New York City Social Hygiene Week, January 29–February 6.)
- Southern California Public Health Association. Los Angeles, Calif. February 18.
- State Charities Aid Association—State and Local Committees on Tuberculosis and Public Health. Hotel Commodore, New York, N. Y. May 20–21.
- Tennessee Public Health Association. Nashville, Tenn. May.
- Western Branch, American Public Health Association—12th Annual Meeting. San Diego, Calif. May 26–30.

#### Foreign

- International College of Surgeons. Mexico City, Mexico. August 10–13.
- Pan American Medical Association—8th Congress. Buenos Aires, Argentina. 1941.

## Best Sellers in the Book Service for January

Military Preventive Medicine. 3d ed. Lieut. Col. G. C. Dunham .....	\$2.50
A Manual of the Common Contagious Diseases. Philip Moen Stimson .....	4.00
Manual of Public Health Nursing. 3d ed. National Organization for Public Health Nursing.....	2.50
Viruses and Virus Diseases. Thomas R. Rivers.....	{Paper 1.75 Cloth 2.50
Public Health Administration in the United States. 2d ed. Wilson G. Smillie.....	3.75
Dermatology and Syphilology for Nurses, including Social Hygiene. John H. Stokes.....	2.75
Preventive Medicine and Hygiene. 6th ed. Milton J. Rosenau	10.00
Manual of Public Health Bacteriology and Chemistry. 2d ed. Department of Public Health, San Francisco.....	1.50
Municipal and Rural Sanitation. 2d ed. Victor M. Ehlers and Ernest W. Steel.....	4.00
The Control of Communicable Diseases. American Public Health Association.....	.30

*Order from the Book Service*

**American Public Health Association**

1790 Broadway

New York, N. Y.

## The DOUBLE VALUE of Grapefruit

Everybody knows that grapefruit is a prime source of Vitamin C as well as a good source of Vitamins B<sub>1</sub> and G and mineral salts.

But did you know that fresh grapefruit is also a very economical source of Vitamin C? And *canned* grapefruit juice is the cheapest of all sources with the single exception of cab-

bage in large quantities.

It also has the valuable property of increasing the body's assimilation of the calcium *taken in other foods*, and is of itself a fine, wholesome, *natural* food, tempting to the fickle palate, delicious and satisfying.

Largely owing to its low cost, doctors, dentists, and public health workers are

recommending grapefruit particularly to the low income groups where serious nutritional deficiencies must be overcome with a minimum of expense.

You will find the whole subject of citrus fruits carefully and authoritatively treated in the recently published "Citrus Fruits and Health" of the Citrus Commission of the State of Florida.

*Write today for a free copy.*

FLORIDA CITRUS COMMISSION

LAKELAND  
FLORIDA



New evidence supports  
prophylactic use of . . .

## PERTUSSIS ANTIGEN (Detoxified)

### *Lederle*

SOME MONTHS AGO Lederle presented a favorable preliminary report on the studies of Pertussis Antigen by JOSLIN and CHRISTENSEN. These investigators have now published<sup>1</sup> results of their additional clinical work with "Pertussis Antigen (Detoxified) Lederle."

According to available information<sup>2</sup> eighty per cent. or 4 out of 5 susceptible children usually contract whooping cough after intimate exposure to the disease. Hence the long recognized need for an efficient prophylactic agent. In the tables below average protection rates of 81\* and 76 per cent. were recorded in groups immunized before and after exposure.

\*"Children immunized with 6cc. of Antigen who had definite exposures showed a rate of protection of 94%." The duration of immunity varied from 5 months to 2½ years.

The duration of the attack in 1051 patients after starting treatment with "Pertussis Antigen (Detoxified) Lederle" was approximately one-half that of a control group of 216 patients.

The usual complications occurred in less than 1% of the antigen-treated patients as compared with 18% in the patients who did not receive the antigen.

Adequate dosage is of prime importance. Previous failures have been attributed to low dosage. The optimal amount of antigen per dose seems to be between 1.5cc. and 2cc. and the average number of injections 4. The optimal interval between doses appears to be 48 to 72 hours.

Reactions to the antigen were infrequent.

<sup>1</sup>Reprint of article "Prophylaxis and Treatment of Whooping Cough with a Pertussis Antigen" by JOSLIN, C. L. and CHRISTENSEN, T. A. Amer. J. Dis. Children, 60:6, 1269, Dec. 1940, will be sent upon request.

<sup>2</sup>Cecil's text book of medicine, 4th Edition, 1939.

"Pertussis Antigen (Detoxified) Lederle"

#### PACKAGES:

3 vials—2 cc. each  
1 vial—20 cc.

PROPHYLACTIC IMMUNIZATION				
Number of Children Immunized	Number Definitely Exposed	Number Contracting Disease	Number Escaping Disease	Average Rate of Protection
982	183	34	149	*81%

\*"Children immunized with 6cc. of Antigen who had definite exposures showed a rate of protection of 94%."

IMMUNIZATION AFTER EXPOSURE			
Number of Children Exposed	Number Escaping Disease	Number Contracting Disease	Rate of Protection
118	90	28	76%

**LEDERLE LABORATORIES, INC.**  
30 ROCKEFELLER PLAZA  
NEW YORK, N. Y.

# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

March, 1941

Number 3

## CONTENTS

PAGE

Recent Extension of Endemic Typhus Fever in the Southern United States . . . 219

*Henry E. Meleney, M.D.*

Cotton Rats and White Mice in Poliomyelitis Research . . . . . 228

*Charles Armstrong, M.D.*

The Local Health Officer and Military Emergencies . . . . . 233

*Haven Emerson, M.D.*

Observations on Fecal Examinations in Poliomyelitis . . . . . 239

*James D. Trask, M.D., and John R. Paul, M.D.*

*Continued on page vi*

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear. These are not to be regarded as expressing the views of the American Public Health Association unless formally adopted by vote of the Association.

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Reader's Guide in your Library.

Published by the American Public Health Association at 374 Broadway, Albany, N. Y.  
Executive Office, 1790 Broadway at 58th St., New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States, Cuba and Mexico, South and Central America; \$5.50 for Canada; and \$6.00 for other countries. Single copies 50 cents postpaid. Copyright, 1941, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor, H. S. Mustard, M.D., 600 W. 168th Street, New York, N. Y.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 1790 Broadway at 58th St., New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.

# EACH CAN SAY



**"I WAS A CLERK"**



**"I WAS A LINEMAN"**



**"I WAS A DRAFTSMAN"**

**T**HIRTY-SEVEN years ago, in 1904, the president of the American Telephone and Telegraph Company went to work as a clerk in one of the Bell System companies.

About that time, the 18 men who are now the presidents of the Bell telephone companies were starting their careers. For, like the head of the System, they have worked many years in the business — an average of 38 years each. Each of them can say: "I was a clerk," "I was a lineman," "I was a draftsman"—and so on.

The "know how" is here — for the every-day job of running the telephone business or to serve you in emergency. Up-from-the-ranks management is doubly important these days.



**BELL  
TELEPHONE  
SYSTEM**

*The Bell System is doing  
its part in the Country's  
program of National  
Defense.*

Gastroenteritis Outbreaks from Cream-Filled Pastry . . . . .	245
--	-----

*F. E. Coughlin, M.D., Dr.P.H., and  
Bascom Johnson, Jr. M.D., M.P.H.*

Vital Statistics and National Defense . . . . .	251
---	-----

*Stuart A. Rice, Ph.D.*

Discussion—*Louis I. Dublin, Ph.D.*

Exhibits . . . . .	257
--------------------	-----

*Mayhew Derryberry, Ph.D.*

# EDITORIALS:

Charles Value Chapin, 1856-1941 . . . . .	264
---	-----

National Defense and the Public Health . . . . .	265
--	-----

The Merit System and Public Health Work . . . . .	266
---	-----

Dr. Stiles, Dr. Vincent, Dr. Rose . . . . .	267
---	-----

Credit Lines: A Selective Digest of Diversified Health Interests— <i>D. B. Armstrong, M.D., and John Lentz, M.S.</i> . . . . .	269
--	-----

Posters for a Pittance. Proceedings of the Seventh Institute on Public Health Education. The N.T.A. Early Diagnosis Campaign. To Be or Not To Be—a Doctor. The Vanishing Point. By Way of Evaluation. Magazine Articles. A Medical School in Health Education. No Place Like a Healthful Home. Miscellaneous Comments.

*Continued on page viii*

*Reprint prices furnished upon request*

**UP-TO-THE-  
MINUTE!**

*For Assurance*



### TYPICAL BLUE ITEMS

Cat. No. 37035

#### SEROLOGICAL PIPETTES

Calibrated to the tip  
for "blowout"

Capacity ml.	Sub- divisions ml.	Quantity in Case	Each
1/10	1/100	72	\$0.40
2/10	1/100	72	.40
1	1/10	72	.35
1	1/100	72	.45
2	1/10	72	.45
5	1/10	72	.45
10	1/10	72	.50

For quantity prices, see your dealer.



# Contents—Continued

	PAGE
Books and Reports . . . . .	274
L. Emmett Holt: Pioneer of a Children's Century. Methods of Analysis, Official and Tentative, of the Association of Official Agricultural Chemists (5th ed.). Report of the Sex Question. A Research Conference on the Cause and Prevention of Dental Caries, 1938. The Streptococci—Their Descriptions, Classification and Distribution, with Special Reference to Those in Milk. Wonder Stories of the Human Machine (Ten Pamphlets reprinted from <i>Hygeia</i> ). Graduate Medical Education. Emotion and Conduct in Adolescence. Fundamentals of Bacteriology (2nd ed.). Elementary Bacteriology: History, Fundamentals, Pathogenic and Non-Pathogenic (4th ed.).	
Books Received . . . . .	281
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . .	282
Association News . . . . .	285
Applicants for Membership. Deceased Members.	
Employment Service . . . . .	287
News from the Field . . . . .	290
Conferences and Dates . . . . .	296

## INDEX TO ADVERTISERS

	Page		Page
A. P. H. A.....	XIV	Federation of Sewage Works Associations..	XXVIII
Book Service . . . . .	XIX, XXII, XXIV	Florida Citrus Commission.....	XXV
Membership Application Form.....	XX	General Laboratories Division, Pennsylv-	XXVII
Affiliated Societies and A.P.H.A. Branche-	XX	ania Salt Mfg. Co.....	XXIII
Aluminum Seal Company.....	XI	International Equipment Company.....	XVI
American Can Company.....	XXIX	Johnson & Johnson.....	VII
American Meat Institute.....	XXVI	Kimble Glass Company.....	III
American Telephone and Telegraph Co...	V	Lederle Laboratories, Inc.....	XV, XXI
Bell Telephone System.....	V	Merck & Co., Inc.....	IX
Canadian Public Health Association.....	XXVII	National Drug Company, The.....	XXV
Corning Glass Works.....	XIII	N.O.P.H.N . . . . .	XXV
Difco Laboratories, Inc.....	Back Cover	Public Health Nursing.....	XIII
Directory of Health Service.....	XXVIII	Pyrex Brand Laboratory Ware.....	II
Bendiner & Schlesinger Laboratories		Squibb, E. R., & Sons.....	XXIII
Black and Veatch		Trained Nurse, The.....	XVIII
Book Service, A.P.H.A.		Wallace & Tiernan Co., Inc.....	XVII
Committee on Administrative Practice.		Wisconsin Alumni Research Foundation ..	
A.P.H.A.			

# American Journal of Public Health

## and THE NATION'S HEALTH

---

Volume 31

March, 1941

Number 3

## Recent Extension of Endemic Typhus Fever in the Southern United States\*

HENRY E. MELENEY, M.D., F.A.P.H.A.

*Associate Professor of Preventive Medicine and Public Health, Vanderbilt  
University School of Medicine, Nashville, Tenn.*

THE report of Maxcy<sup>1</sup> in 1928 on the distribution of endemic typhus fever in the United States emphasized the importance of the disease in the southern states, especially in Georgia, Alabama, and Texas, and certain cities of Florida, South Carolina, North Carolina, Virginia, and Maryland. At that time no cases of the disease had been reported from Mississippi, Louisiana, or Tennessee. The transmission of the disease from rat to man had not been worked out and the existence of the eastern form of Rocky Mountain spotted fever had not been discovered. Since that time, a number of reports have indicated the growing importance of the disease in the states where it was shown by Maxcy to exist and its extension to other states. In addition, the rat as the reservoir host, and the rat flea as the chief vector, have been firmly established. The disease has been differentiated from spotted fever and considerable advance has been made in methods of prevention.

Dougherty,<sup>2</sup> Sellers,<sup>3</sup> and Bowdoin

and Boston<sup>4</sup> have reported the extension of the disease in Georgia and have described methods of control. Baker, McAlpine, and Gill<sup>5, 6</sup> have reported its extension in Alabama. Hinman<sup>7</sup> has reviewed the history of both epidemic and endemic typhus fever and the recent occurrence of the endemic disease in Louisiana. Riley<sup>8</sup> has reported its increasing occurrence in Mississippi. Reece<sup>9</sup> and Bohls<sup>10</sup> have reported its increasing importance in Texas. Litterer<sup>11</sup> has reported the discovery of the first cases in Tennessee, and Lumsden and Tucker<sup>12</sup> its increase in incidence in that state. Munson<sup>13</sup> has reported the increase of cases in California. Gordon<sup>14</sup> has also reviewed the incidence of the disease in individual states through 1938.

The purpose of the present paper is to present a picture of the relative importance of the disease in individual southern states at the present time and to show its recent extension to new areas. The writer is indebted to the state health departments and to a number of city health officers for the data which are presented. Endemic typhus in the northeastern coast cities will not be considered because the disease in

---

\* Read before a Joint Session of the Health Officers and Epidemiology Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 10, 1940.

those cities may be of different origin from that in the South and because there seems to be no increase in the number of cases from year to year. California, on the other hand, will be mentioned because there seems to be an increase in incidence similar to that in the southeastern states.

#### INCIDENCE IN SOUTHERN STATES AND COUNTIES

The number of cases of endemic typhus fever reported in individual southern states from Maryland to Texas and in California from 1922 to 1939 is shown in Table 1. The data given in this table are those furnished by the state health departments, except that in South Carolina they have been supplemented by data from the City Health Department of Charleston, and in Tennessee by Litterer's cases in 1927. In most cases the records do not go back as far as 1922, but they may be considered fairly accurate since 1929. The totals for all the states together after that time show a rapid increase up to 1933, then a sudden drop in 1934 and 1935, a sharp increase in 1936 and 1937, another slight drop in 1938, and an increase in 1939 to the highest number

for any one year. The drop in 1934 and 1935 followed extensive rat extermination campaigns in Georgia, Alabama, and Texas, and was thought by the public health authorities of those states to be the result of rat extermination. It is interesting to note, however, that in 1934 there was also a decrease in reported cases in North Carolina, South Carolina, and Florida, so that other factors may have been partly responsible. The peak of incidence in 1939 involves all of the states south of Virginia except Alabama which has shown only a moderate increase in cases since the decrease in 1934.

The record from California undoubtedly includes a number of cases of louse-borne typhus during the years 1922 to 1924. Even at that time, however, some of the cases gave epidemiological evidence of having acquired their infection from close contact with rats. The increase in cases during the past few years undoubtedly represents endemic typhus entirely. Since 1935, all of the cases in California except one have occurred in Los Angeles and San Diego Counties.

In order to demonstrate the relative importance of endemic typhus in indi-

TABLE 1

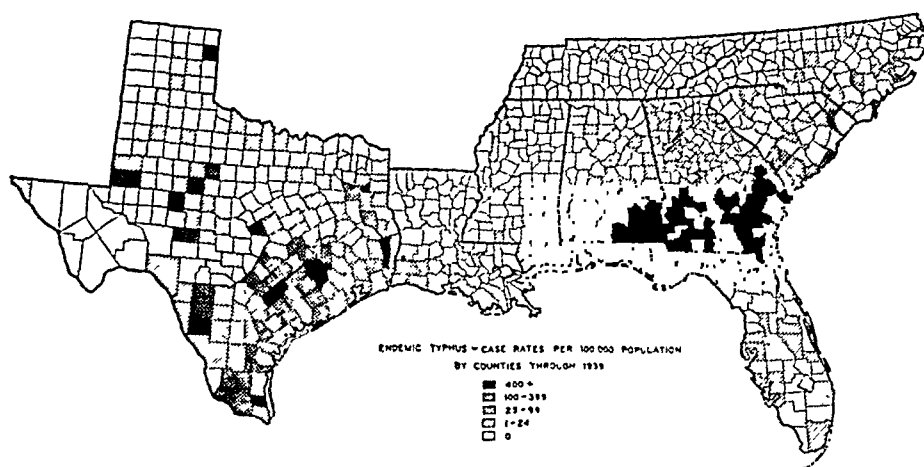
*Cases of Endemic Typhus Reported to State Health Departments of 12 States, 1922-1939*

State	Year																		Total
	'22	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	'34	'35	'36	'37	'38	'39	
Maryland	1	4	3	6	12	0	5	7	38	21	23	18	15	15	2	5	12	8	173
Virginia	..	..	..	..	..	8	11	21	47	20	22	14	5	7	6	5	7	8	131
North Carolina	..	..	..	..	..	..	..	3	16	14	24	46	23	51	33	68	81	122	421
South Carolina *	..	..	..	..	..	1	1	3	2	4	26	52	27	43	63	106	147	232	707
Georgia	..	..	..	..	17	32	35	52	153	114	290	624	407	489	816	1,076	1,017	1,103	6,215
Florida	..	..	4	3	16	44	49	48	38	31	41	54	36	27	55	126	80	154	855
Alabama	14	0	2	52	47	66	59	70	66	80	236	819	270	294	373	494	338	471	3,751
Mississippi	..	..	..	..	..	..	..	..	..	..	..	1	0	6	18	30	42	61	152
Louisiana	..	..	..	..	..	..	..	1	0	1	17	11	17	20	12	23	27	115	244
Texas	..	..	..	..	20	16	5	8	15	43	233	392	465	265	327	453	497	538	3,277
Tennessee	..	..	..	..	..	4†	2	2	0	1	2	1	0	8	6	21	24	100	153
California	9	16	17	0	3	0	2	1	1	2	1	4	4	3	9	16	21	30	139
Total	24	20	26	61	115	168	169	216	376	331	915	2,036	1,269	1,228	1,720	2,423	2,293	2,942	16,312

\* State Health Department data supplemented by data from Charleston City Health Department

† Cases reported by Litterer<sup>21</sup>

MAP. 1—The relative importance of endemic typhus fever in individual counties of 9 southern states. Case rates per 100,000 population (1930) by counties, based upon the total number of cases reported by each county from 1922 through 1939



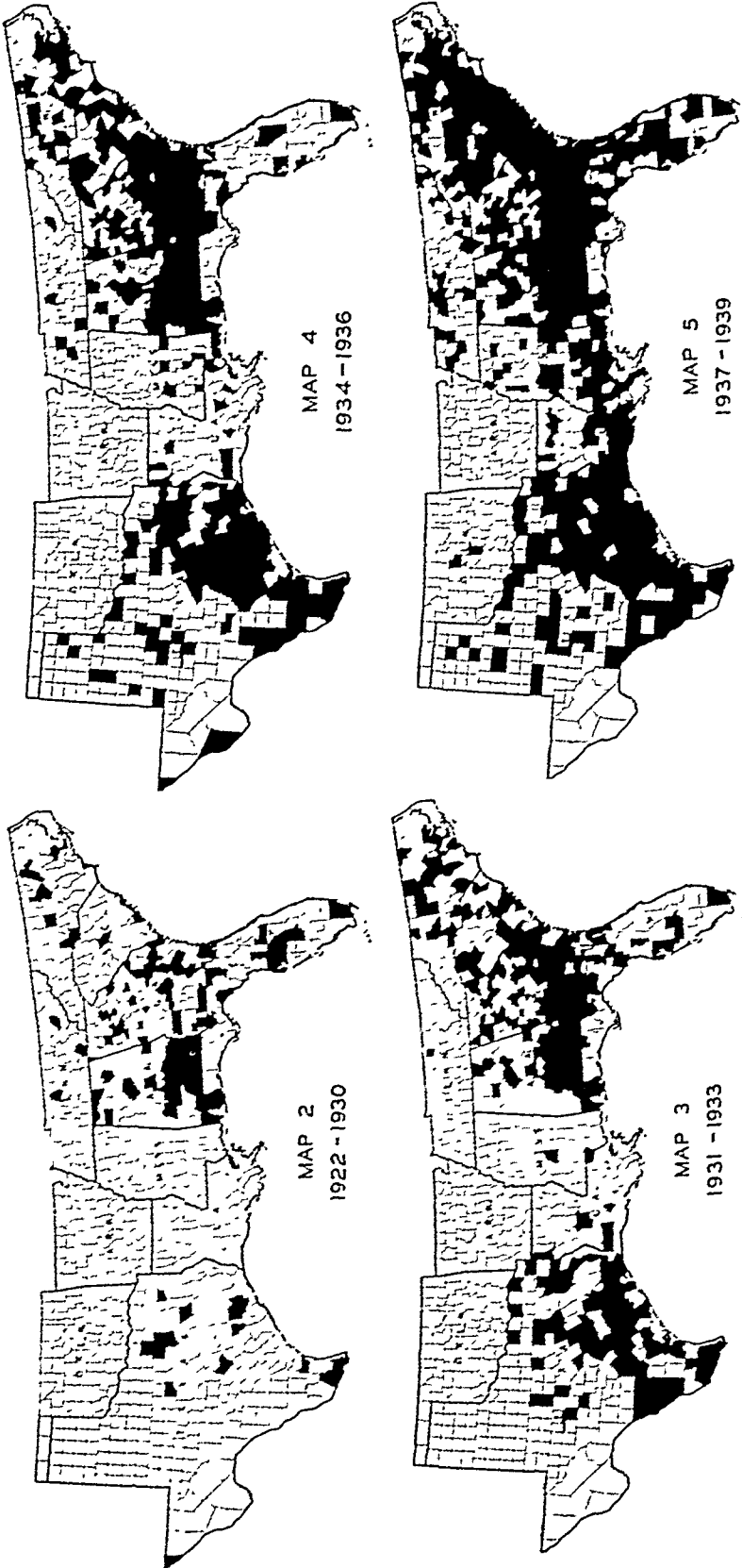
vidual counties of the southern states, Map 1 has been prepared showing the case rate per 100,000 population calculated for the entire 18 year period 1922-1939. The 1930 population has been used in calculating the rates. This map shows that the most important area involves the southern part of Georgia, and the southeastern part of Alabama, with less important areas extending into the southern part of South Carolina and the northern part of Florida. The other important area is in southern and eastern Texas. Between these two centers, Louisiana and Mississippi are becoming important, and Nashville, Tenn., has suffered a severe outbreak. North Carolina seems to be

the northern border of the southern endemic area, while Virginia and Maryland have not been included in the map because they are relatively unimportant in the endemic area except for port cities.

Table 2 and Maps 2, 3, 4, and 5 have been prepared to show the increasing number of counties reporting cases of endemic typhus from 1922 through 1930 and by 3 year periods since that time. It will be seen from Table 2 that in general there has been a steady increase in the number of counties reporting cases. Not all of the counties reporting cases in the earlier periods have continued to have cases in recent years, so that the total number of counties

TABLE 2  
*Endemic Typhus Fever in Counties of 12 States, 1922-1939*

State	Number of Counties Reporting Cases					Total Counties in State	Per cent of Counties Reporting Cases
	1922- 1930	1931- 1933	1934- 1936	1937- 1939	Through 1939		
Maryland	13	14	12	8	19	23	82.6
Virginia	32	28	11	6	49	99	49.5
North Carolina	9	24	29	50	63	100	63.0
South Carolina	3	17	25	41	42	46	91.3
Georgia	38	94	109	113	134	159	84.3
Florida	15	19	14	38	44	67	65.7
Alabama	26	29	40	49	57	67	85.1
Mississippi	0	1	10	30	31	81	38.3
Louisiana	1	6	9	31	32	64	50.0
Texas	14	78	108	131	157	254	61.8
Tennessee	4	2	5	21	25	95	26.3
California	3	3	3	3	7	58	12.1
Total	158	315	375	521	660	1,113	59.3



MAPS 2, 3, 4, AND 5—Counties in 10 southern states reporting cases of endemic typhus fever in the period 1922-1930, and in the three following 3 year periods

Outline maps copyright by Rand McNally and Co., Chicago

reporting cases through 1939 is greater than the number reporting cases from 1937 to 1939. Although Virginia and Maryland show a high percentage of counties reporting cases, the number is smaller for the period 1937-1939 than for previous periods. This will be commented upon later. In each of the states from North Carolina to Alabama, and in Texas, over 60 per cent of the counties have reported cases since 1922, and 50 per cent or more reported cases during the last 3 year period.

Maps 2, 3, 4, and 5 show the location of the counties reporting cases. Prior to 1931 (Map 2) Alabama appears to have had the most extensive continuous endemic area, but since that time (Maps 3, 4, and 5) this area has become contiguous with a broad strip of counties extending eastward through Georgia, South Carolina, and North Carolina, and narrower strips extending southward through Florida and westward through Mississippi and Louisiana to join the Texas area. The Texas area itself has extended throughout most of the southern and eastern part of the state and now reaches to the Oklahoma border and into the Panhandle. In Tennessee cases have been reported recently (Map 5) from counties along the eastern and southern borders as well as in the region surrounding Nashville and in West Tennessee. Although it is believed that the cases from some of the rural counties in Tennessee were probably spotted fever, it is interesting that a number of these counties are adjacent to states where typhus is highly endemic.

Prior to 1931, recognition of endemic typhus by physicians was limited, and state health departments had only begun to employ the Weil-Felix reaction routinely on blood sera submitted for the diagnosis of other febrile diseases. Since 1931, however, the increase in reported cases can be due in only a minor degree to the increased recognition of

the disease. The opinion of both practitioners and public health authorities is unanimous that the incidence of the disease has increased greatly. The only states in which the number of counties reporting cases has decreased within the past 9 years are Virginia and Maryland. The eastern form of Rocky Mountain spotted fever was first differentiated from endemic typhus in 1930. Most of the early cases were found in Virginia and Maryland, and it was recognized that many cases previously reported as typhus were actually spotted fever. Since that time, the number of reported cases of typhus fever in those states has decreased, while the number of cases of spotted fever has increased. Spotted fever has also become recognized as an important disease in North Carolina and Tennessee, but relatively few cases have been reported from the other southern states in which endemic typhus is important.

#### OCCURRENCE IN OTHER STATES

Inquiry from the state health departments of states adjacent to those which have been mentioned has elicited the following information. The District of Columbia has had no cases since 1932 and the opinion is expressed that prior to that time some of the cases which were reported as typhus were probably spotted fever. West Virginia reported 1 case in each of the following years: 1931, 1933, 1935, and 1939. The case in 1939 occurred in a mining camp near the Ohio River where there were many rats, and the patient had trapped rats several weeks prior to becoming ill. Kentucky reported 1 case in 1933 and 1 in 1937, but there is some question about the diagnosis in both cases. Missouri reported 5 cases in 1922, 1 in 1935, and 1 in St. Louis in March, 1940. Iowa reported 1 case in Des Moines in 1936.<sup>15</sup> Arkansas reported 2 cases in 1939, but on investigation one of these cases was very doubtful

and the other probably spotted fever. Oklahoma reported 1 case in 1927, 1 in 1937, 1 in 1938, 1 in 1939 and 3 through August, 1940.

#### OCCURRENCE IN SOUTHERN CITIES AND IN RURAL AREAS

Endemic typhus in the United States has been considered mainly a disease of cities and towns. The disease was first discovered in cities, and the largest numbers of cases have always been reported in cities. In order to record the data for a number of cities as accurately as they could be obtained at the present time, Table 3 has been prepared from several sources. It will be seen that despite the knowledge of the existence of the disease in these cities and despite the control measures which have been instituted in most of them, the total number of cases has gradually increased during the past few years. Eight of these cities reported more cases in 1939

than in any previous year, and a number of others nearly reached their previous maxima. Nashville, Tenn., is particularly noteworthy in that an outbreak of 75 cases occurred in the summer and autumn of 1939, while the largest number previously reported in any one year was 11. Nashville reported more cases in 1939 than any other city in the country except Savannah, Ga., which has reported the largest number of cases each year except in 1938 when it was exceeded by Charleston, S. C.

The most highly endemic areas, however, are those in southern Georgia and southeastern Alabama which are peanut growing areas, and Baker, McAlpine, and Gill<sup>5,6</sup> stated in 1934: "From the urban centers the disease has spread until much of the incidence is now in purely rural areas and among people who could not have obtained their infection except at home." Furthermore, Dyer<sup>16</sup> found that the woodchuck,

TABLE 3  
*Endemic Typhus Fever in 17 Cities, 1921-1939*

City	Year																		
	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	'34	'35	'36	'37	'38	'39
Charlotte, N. C.	11		*	*	*	*	*		1	3	3	2	2	1	5	2	3	9	10
Charleston, S. C.	3	15	0	0	0	0	1	1	3	2	4	10	33	22	21	21	35	74	64
Atlanta, Ga.	..	8	9	3	3	6	13	0	0	4	15	16	46	24	59	25	34	27	57
Macon, Ga.	..	..	..	..	..	..	1	0	0	1	3	1	9	9	18	18	12	18	16
Savannah, Ga.	..	..	37	13	44	40	72	67	52	87	85	110	104	90	69	74	69	72	82
Jacksonville, Fla.	..	..	..	3	2	15	14	9	11	4	6	11	15	8	4	12	23	20	29
Miami, Fla.	..	..	..	..	..	..	1	4	8	4	6	4	0	3	4	2	18	10	17
Tampa, Fla.	..	..	..	1	0	0	25	28	17	21	12	16	23	11	9	10	6	4	15
Birmingham, Ala.	..	1	3	2	1	1	2	1	1	0	0	2	3	3	1	8	8	4	9
Mobile, Ala.	..	2	0	2	17	10	17	10	5	2	1	5	25	12	11	11	10	19	44
Montgomery, Ala.	..	6	6	8	24	3	4	*	*	*	*	*	27	23	36	26	23	7	22
New Orleans, La.	..	..	..	..	..	..	..	..	1	0	0	5	4	4	6	2	1	2	17
Dallas, Tex.	..	..	..	..	..	..	..	..	6	3	4	6	4	24	11	1	4	5	22
Ft. Worth, Tex.	..	..	..	..	..	..	..	..	..	0	7	2	1	5	9	11	7	10	21
Houston, Tex.	0	1	0	1	3	0	1	3	0	2	0	10	5	5	7	5	15	23	46
Nashville, Tenn.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	3	11	9	75
Los Angeles, Calif.	..	9	15	15	0	2	0	0	0	1	1	0	2	2	2	3	6	12	20

Data Obtained from State Health Departments Except as Follows:

Charleston, S. C., 1921-1926 from Maxcy,<sup>1</sup> 1927-1939 from City Health Department  
 Atlanta, Ga., 1921-1927 from Maxcy,<sup>1</sup> 1928-1931 from City Health Department  
 Macon, Ga., 1927-1931 from City Health Department  
 Savannah, Ga., 1923-1939 from City Health Department  
 Birmingham, Ala., 1922-1926 from Maxcy,<sup>1</sup> 1927-1932 from City Health Department  
 Mobile, Ala., 1922-1927 from Maxcy,<sup>1</sup> 1928-1932 from City Health Department  
 Montgomery, Ala., 1922-1927 from Maxcy,<sup>1</sup>  
 All Texas cities from City Health Departments

\* Charlotte, N. C., 1924-1928, and Montgomery, Ala., 1928-1932, records not available

TABLE 4

*Endemic Typhus Case Rates per 100,000 Population in Rural Areas and in Incorporated Towns of Georgia, Alabama, and North Carolina, 1933-1939*

State	Rural	Incorporated Towns Having a Population of						State
		1-999	1,000-2,499	2,500-4,999	5,000-9,999	10,000-24,999	25,000+	
Georgia	....	161.6*	.....	603.6	300.7	209.1	183.5	190.2
Alabama	64.5	457.2	459.4	347.2	374.7	108.8	84.3	115.6
North Carolina	5.8	22.2	26.5	58.3	7.9	47.5	19.8	13.4

\* This rate includes rural areas and incorporated towns up to 2,499 population.

house mouse, and two species of wild mice could be experimentally infected with typhus, and Brigham and Dyer<sup>17</sup> found that the opossum, three species of field mice, three species of field rats, and the flying squirrel could be infected. They found one "old-field mouse" naturally infected. In Texas, J. and A. A. Chapman<sup>18</sup> described two cases of typhus fever which they believed were contracted from fleas on opossums.

Bowdoin and Boston,<sup>4</sup> however, while admitting that in Georgia there is a considerable incidence in the rural areas, showed that the highest incidence was in cities of 2,500 to 5,000 population. In their analysis, towns having a population of less than 2,500 were included in the rural classification, and they believed that the small towns and villages would account for a large proportion of the cases reported as rural. A number of cases have been cited in the literature in which farmers who contracted the disease were known to have visited feed stores or other establishments in towns where other cases of the disease had occurred. Table 4 shows the case rates per 100,000 population (1930) from 1933 through 1939 for rural areas and for incorporated towns and cities of various sizes in Georgia, Alabama, and North Carolina. As the data from Georgia were not available for towns of less than 2,500 population, these are combined with the rural areas. In the absence of data from the smaller towns, the highest rate in Georgia appears to be in towns of

2,500 to 5,000 population, as stated by Bowdoin and Boston.<sup>4</sup> In Alabama the highest rates are in towns of less than 2,500 population, and the rate is practically the same in towns below 1,000 as in towns of 1,000 to 2,500 population. In North Carolina the rate is highest in towns of 2,500 to 5,000 population.\*

An attempt was made to determine whether the rate of increase of endemic typhus during recent years has been more rapid in rural areas or in towns. Data for this analysis were available only from Georgia, Alabama, and North Carolina. In Georgia, where the data for towns with a population of less than 2,500 were combined with those from rural areas, there was evidence of a slightly more rapid increase in the annual rate for rural areas than in that for towns. In Alabama no definite difference in the two rates could be seen, but the data were available only as far back as 1933 when the number of reported cases in that state had already reached its peak. In North Carolina there was a slightly more rapid increase in the rate for towns than in that for rural areas. No definite conclusion can be drawn from this analysis. It may be, however, that in Georgia and Alabama, where the endemicity of the disease is high, the large reservoir of infection in cities serves as a greater source of spread

\* Rates for incorporated towns of less than 1,000 population in different states may not be strictly comparable, because of differences in the tendency of small towns to become incorporated. For instance, in Alabama there were in 1930 only 53 incorporated towns in this group whereas in North Carolina there were 343.



to rural areas than in North Carolina where the endemicity is still low. It may be that in North Carolina the progress of the disease is in an earlier stage than in the other two states, or it may be that the more northern location of North Carolina furnishes less favorable opportunities for the extension of the rat and flea reservoirs of infection into rural areas.

#### DISCUSSION

The origin of endemic typhus fever in the United States is still a matter of speculation. In the port cities of the northeastern states the assumption seems to be that it was imported from northern Europe. Zinsser's<sup>19</sup> interesting conclusion that cases of Brill's disease were exacerbations of previous infections acquired in Russia cannot be entirely discarded on the basis of the evidence which he presented, but aside from the occurrence of the disease almost exclusively in persons who had emigrated from Russia, the epidemiology of the disease is essentially similar to that in southern port cities, and the rat and rat flea must still hold first attention in our conception of its transmission. The introduction of the disease into port cities along the southern Atlantic and Gulf coasts may also have been from Europe, but conceivably may have been from Latin America, although Mexico is the only Latin American country where the disease is known to have existed to any great extent in endemic form. Texas may have been invaded partly from Gulf ports, a view supported by the fact that the disease has been most prevalent in the southeastern portion of the state. A considerable part of the invasion, however, probably came across the Mexican border.

There is some evidence that Brill's disease in the northeastern port cities and the endemic typhus of the southern states are infections caused by different

strains of rickettsiae,<sup>20</sup> but that question is beyond the scope of this paper.

Undoubtedly the extension of endemic typhus in the southern United States is due primarily to the migrations of the brown rat, *Rattus norvegicus*, and of the tropical rat flea, *Xenopsylla cheopis*. An increase in the rat population has been noted in many places coincident with the appearance or increase of typhus fever. Maxcy<sup>1</sup> called attention to the railroads and highways as probable routes by which the reservoir of the disease migrated from the coast to the interior. In the study of the Nashville outbreak in 1939 it was found that the main focus of the disease was in granaries and other establishments close to the railroads entering the city from the south and southeast. With the recent improvement in roads and the increase of transportation by trucks, better facilities have been provided for the transportation of rats and fleas to distant points. The direct migration of rats from town to town, along highways and through the fields, is a slower process, but undoubtedly occurs and furnishes an opportunity for susceptible wild rodents to become reservoirs of the disease. This direct migration of rats is probably the explanation of the high endemicity in the peanut growing areas of Georgia and Alabama.

The facts that endemic typhus has not yet been controlled in many of the large cities of the southern states, and that it has appeared recently in new cities far from its earlier habitat, indicate its increasing importance as a public health problem. Some cities in which it has not yet appeared have already started campaigns for rat control, and it would be wise for all state and city health authorities to undertake such a program. Although the southern states offer a more favorable climate for the breeding and spread of rats and fleas, the fact that endemic typhus has

maintained itself in northern cities for many years indicates that it can spread much farther north than it has done up to the present time.

The rat has already too long been an economic burden as well as a health menace in this country. Now that simplified methods have been developed by the rat control forces of the State Health Department of Georgia and the U. S. Public Health Service for preventing the entrance of rats into buildings, such programs can be instituted at relatively small expense, with definite expectation of success and with the hearty coöperation of business establishments and home owners. The U. S. Public Health Service and the state health departments of the western states are trying desperately to prevent the spread of plague into the Mississippi Valley. It would indeed be a misfortune if plague and typhus should meet in the cities of this region.

#### SUMMARY AND CONCLUSIONS

1. The incidence of endemic typhus has increased rapidly in the Atlantic and Gulf states from North Carolina to Texas, and in Tennessee, during the last decade. There has been a similar but smaller increase in southern California. In all of these states except Alabama more cases were reported in 1939 than in any previous year.

2. This increase has consisted of a higher incidence in most of the large cities where the disease was first discovered, and also an extension to other cities and towns and to rural areas. Nearly 60 per cent of the counties in these states have reported cases since 1922. The highest case rates appear to be in small towns.

3. The most highly endemic areas are in southern Georgia, southeastern Alabama, and southeastern Texas. Louisiana, Mississippi, and Tennessee are the latest states to show an important increase in cases. Nashville, Tenn., reported more cases in 1939 than any city except Savannah, Ga.

4. A few authentic cases have been reported in recent years from West Virginia, Missouri, Oklahoma, and Iowa. Virginia and Maryland have reported very few cases of typhus since the discovery of Rocky Mountain spotted fever in those states.

5. In order to control endemic typhus where it is now present it will be necessary to institute more vigorous rat eradication programs than have been carried on in the past; and in order to prevent its further spread to new areas it is advisable for state and city health departments in unaffected localities to begin similar programs.

#### REFERENCES

1. Maxcy, K. F. The Distribution of Endemic Typhus (Brill's Disease) in the United States. *Pub. Health Rep.*, 43:3084 (Nov. 23), 1928.
2. Dougherty, M. S. Endemic Typhus Fever in Georgia. *J.M.A. Georgia*, 24:1 (Jan.), 1935.
3. Sellers, T. F. Recent Developments in the Knowledge of Endemic Typhus Fever. *J.M.A. Georgia*, 24:7 (Jan.), 1935.
4. Bowdoin, C. D., and Boston, R. J. A Preliminary Report on the Practical Epidemiology and Control of Endemic Typhus Fever in Georgia. *Am. J. Trop. Med.*, 20:537 (July), 1940.
5. Baker, J. N., McAlpine, J. G., and Gill, D. G. Endemic Typhus. *A.J.P.H.*, 24:1068 (Oct.), 1934.
6. Baker, J. N., McAlpine, J. G., and Gill, D. G. Endemic Typhus in Alabama. *Pub. Health Rep.*, 50:12 (Jan. 4), 1935.
7. Hinman, E. H. History of Typhus Fever in Louisiana. *A.J.P.H.*, 26:1117 (Nov.), 1936.
8. Riley, G. E. Typhus and Rocky Mountain Spotted Fever in Mississippi. Unpublished paper read before the Mississippi Public Health Association, Dec., 1939.
9. Reece, C. D. Typhus Fever in Texas. *Texas State J. Med.*, 30:192 (July), 1934.
10. Bohls, S. W. Typhus Fever in Texas. *South. M. J.*, 28:1162 (Dec.), 1935.
11. Litterer, W. A Discussion of Three Fevers Which Simulate Typhoid. *J. Tennessee M. A.*, 21:52 (June), 1928.
12. Lumsden, L. L., and Tucker, C. B. Clinical and Epidemiological Features and Differential Diagnosis of Rocky Mountain Spotted Fever and Endemic (Murine) Typhus Fever. *J. Tennessee M. A.*, 32:339 (Oct.), 1939.
13. Munson, E. L. Rocky Mountain Spotted Fever and Endemic Typhus Fever. *California & West. Med.*, 41:365 (Dec.), 1934.
14. Gordon, J. E. The Clinical Features of Rickettsial Diseases. *Virus and Rickettsial Diseases: Symposium, Harvard School of Public Health, 1939.* Harvard Univ. Press, 1940, p. 828.
15. Freed, H., Jordan, C. F., and Eckhoff, D. Endemic Typhus Fever in Iowa. *J. Iowa State M. Soc.*, 27:425 (Aug.), 1937.
16. Dyer, R. E. Endemic Typhus Fever: Susceptibility of Woodchucks, House Mice, Meadow Mice, and White-footed Mice. *Pub. Health Rep.*, 49:723 (June 22), 1934.
17. Brigham, G. D., and Dyer, R. E. Endemic Typhus Fever in Native Rodents. *J.A.M.A.*, 110:180 (Jan. 15), 1938.
18. Chapman, J., and Chapman, A. A. Typhus-like Fever Contracted from Opossum Fleas: A Preliminary Report. *Texas State J. Med.*, 31:36 (May), 1935.
19. Zinsser, H. Varieties of Typhus Virus and Epidemiology of American Form of European Typhus Fever (Brill's Disease). *Am. J. Hyg.*, 20:513 (Nov.), 1934.
20. Zinsser, H. Epidemiology and Immunity in the Rickettsial Diseases. *Virus and Rickettsial Diseases: Symposium, Harvard School of Public Health, 1939.* Harvard Univ. Press, 1940, p. 872.

# Cotton Rats and White Mice in Poliomyelitis Research\*

CHARLES ARMSTRONG, M.D., F.A.P.H.A.

*Senior Surgeon, Division of Infectious Diseases, National Institute of Health,  
U. S. Public Health Service, Washington, D. C.*

FROM the standpoint of availability, cost, expense of maintenance, ease and safety of handling, and resistance to naturally acquired infections, the cotton rat compares favorably with the white rat as a laboratory animal, with the exception that it is somewhat more timid and, in our experience, propagates almost not at all during the colder season of the year. The suitability of the white mouse as a laboratory animal, in so far as these general considerations are concerned, is too well known to require discussion.

In addition to these general considerations, the suitability of cotton rats and of white mice in poliomyelitis research depends upon certain specific qualities, such as the degree and uniformity of susceptibility, the incubation period, and the definiteness of the symptoms of the experimentally induced disease. It is these latter considerations which we desire to discuss.

*Susceptibility to new strains*—The susceptibility of the cotton rat to primary inoculation with poliomyelitis virus is apparently low; for instance, we were able to produce paralysis with the monkey adapted Lansing strain of virus in 1937 in one of 2 cotton rats

after an incubation period of 29 days. During 1938 one of 11 cotton rats inoculated with the same strain of virus developed paralysis, again on the 29th day. Attempts at further transfer failed in both instances; however, the attempts were somewhat hampered by a shortage of cotton rats. Further attempts at primary transfer in 1939 resulted in one of 4 cotton rats developing symptoms in 15 days. From this rat the virus has to date been successfully carried through 55 successive transfers.

During 1939 a strain of poliomyelitis from Niagara Falls, N. Y., was established in monkeys from which it was inoculated into 4 cotton rats, one of which developed paralysis of the left front leg on the 41st day, but attempts at second transfer failed.

Inoculation of cotton rats with 2 Detroit strains was, in one instance, followed by symptoms in one of several rats in each of 3 successive transfers, but attempts at further passage failed. Attempts with some 6 additional strains have to date given negative results.

Other investigators have attempted to convey strains of poliomyelitis to cotton rats, but without success, so far as we are aware, with the exception of Jungeblut and Sanders who succeeded in transferring a virus to cotton rats from a fecal strain of poliomyelitis. This cotton rat strain has definite peculiari-

\* Read at a Joint Session of the Laboratory and Epidemiology Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

ties, but the authors claim that it is immunologically a strain of poliomyelitis. The cotton rat, therefore, appears to be quite insusceptible to unadapted strains of poliomyelitis and is, therefore, not as satisfactory an animal for primary isolation of the virus as is the monkey. The same is even more apparent for white mice, since we have consistently failed to produce symptoms in this species, except with the Lansing strain of virus following its adaptation to the cotton rat.

*Susceptibility to adapted strain*—White mice and cotton rats appear to be rather uniformly susceptible to the adapted Lansing strain of poliomyelitis. The incubation period in cotton rats is usually between 3 and 8 days, while in mice\* symptoms usually become apparent in from 2 to 10 days following inoculation, but the interval has been observed to vary from 24 hours to 93 days.

In both cotton rats and white mice the symptoms are very distinct, paralysis of one or more legs being the symptom usually first observed, while paralysis of the neck or back is not uncommon, and paralysis of the tongue has been twice noted. Death occasioned by respiratory failure usually occurs within from 12 to 48 hours of the first recognized symptoms. Occasionally an animal recovers after having developed symptoms; in such recovered individuals muscle atrophy and deformities may develop.

Symptoms can be almost uniformly produced in mice when 0.03 cc. of a suspension of mouse tissue, prepared by pooling the basal portions of the brain and the cords from several infected mice, is intracerebrally inoculated in dilutions of from 1:10 to 1:500, while some of the inoculated mice will suc-

cumb to dilutions of virus ranging as high as 1:10,000.

*Route of inoculation*—In our hands the only successful route of inoculation in rodents consists in the direct implantation of the virus within the central nervous system. Intranasal, intraocular, and subcutaneous inoculations, as well as feeding of the virus, have uniformly failed to induce infection. Unless these negative results can be reversed, it would appear that these rodents will contribute but little toward elucidation of the natural route of infection and transit of the virus in man.

*Immunity*—A few mice and cotton rats, recovered from paralytic attacks induced by the Lansing strain of virus, have been reinoculated intracerebrally with the homologous strain and were apparently solidly immune. Following subcutaneous inoculation with emulsions of infected mouse brains, mice develop potent neutralizing antibodies in their sera (see Table 1).

*Protective qualities of humoral antibodies*—Humoral antibodies have shown but little protective value against experimentally induced poliomyelitis of monkeys. However, it is difficult to titer the dosage of virus in this species, and it is conceivable that in mice protection might be made more apparent by reducing the dose of virus to near the minimal infecting dose.

Several such trials have been carried out on groups of mice, and have shown a tendency for a few more immunized mice to survive than was the case in the non-immunized control group (Table 2). These results are, however, possibly related to the artificial method of inoculation, since the needle probably in some instances produces a degree of bleeding at the inoculation site, where the plasma, if immune, by coming into direct contact with the virus would tend to neutralize it and thus tend to prevent infection.

---

\* Gray mice trapped in nature appear to be equally as susceptible as white mice.

TABLE 1

The Development of Virus Neutralizing Antibodies in the Blood of Mice Following Subcutaneous Inoculation with the Lansing Strain of Virus

Experiment 1,109 Serum Collected July 11, 1940, from Mice	Dilution of Virus	No. of Mice Inoculated	Deaths by Days Following Serum-Virus Inoculation																Mice Survived
			1	2	3	4	5	6	7	8	9	10	11	12	13	14 to 21			
Immunized by sub- cutaneous inocu- lation on	1/10	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4		
June 27, 1940	1/20	4	..	..	..	..	..	..	..	..	..	..	..	*3	..	..	1 Immune		
July 5, 1940	1/40	4	..	..	..	..	1	..	..	..	..	..	..	..	..	..	3		
Non-immunized	1/10	4	1	..	..	..	2	..	1	..	..	..	..	..	..	..	0		
mice	1/20	4	1	1	..	..	1	..	..	..	1	..	..	..	..	..	0 Not		
Controls	1/40	4	..	1	..	..	2	..	..	..	..	..	1	..	..	..	0 Immune		

\* Mice killed by cage mate: No paralysis observed  
Inoculation Dosage: 0.03 cc. of mixture of 1 part various dilutions of virus + 1.5 parts undiluted serum

Humoral immunity in the population  
—Cotton rats and white mice are both suitable species for determining the virus neutralizing properties of human sera, but mice, obviously the more ideal of the two species, have been adopted for this purpose in our studies. To date, 293 human sera have been tested, largely by Dr. V. H. Haas, for the presence of antibodies capable of neu-

tralizing the Lansing strain of poliomyelitis virus. The results are usually definite and easily read, and are readily repeatable, and the test requires but 0.45 cc. of serum.  
This group of 293 tested human sera is larger than any series thus far reported by a single laboratory employing monkeys; however, we consider that the study has but just begun. No detailed

TABLE 2

Influence of Subcutaneous Inoculation upon Later Intracerebral Inoculation

1940	Virus Subcutaneously 7-12-40		Virus Dilution Intracerebrally 0.03 cc.	No. Mice Intracerebrally Inoculated	Deaths by Days Following Inoculation																					No. Mice Surviving Per cent of Mice Dying
Experiment 1,109					Immune Status of Mice	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	6/27	7/3																								
Immunized	+	+	1/500	30	*3	..	..	10	2	..	1	..	2	..	..	..	..	1	3	..	3	..	..	..	5 81.5	
Controls	—	—	1/500	35	*2	2	..	13	1	..	..	1	2	..	3	1	4	2	1	..	..	..	..	..	3 90.9	
Immunized	+	+	1/2500	30	..	1	1	3	..	2	..	..	..	..	1	2	1	..	..	..	..	..	..	..	1 18 40.0	
Controls	—	—	1/2500	33	*1	..	..	8	1	..	..	1	..	..	3	..	2	..	..	1	..	2	1	..	13 59.4	

\* Indicates deaths: Excluded as due to Trauma  
Immunized and Control Mice bled July 11, 1940

analysis of our results will therefore be attempted at this time. It may be pointed out, however, that in general the results secured to date are in agreement with the results secured in monkeys. For instance, 65 per cent of the sera were found to be definitely immune, 6.5 per cent partially immune, and 28.5 per cent, non-immune. It was found that the percentage of sera showing protection increased with the age of the donors and that children in institutions tended to a relatively higher percentage of immunity than was the case with the same age group living in urban dwellings. The test is so readily performed that it will now be possible to study humoral immunity adequately in groups and geographical units of the

population and, by repeated tests, to follow immunity development in individuals, and in this way to elucidate, it is hoped, the epidemiology of the disease.

*Chemotherapeutic studies* — Cotton rats and white mice, together with the Lansing strain of virus, are now being utilized in the search for curative agents in poliomyelitis, and these animals will permit studies to an extent practically impossible with the monkey.

*Is the Lansing virus peculiar?*—The failure to establish more well known strains of poliomyelitis in the cotton rat naturally raises the question as to the identity of the Lansing strain with other strains of poliomyelitis virus. The case from which this virus originated

TABLE 3  
*Serum-Virus Protection Test with White Mice*  
*Protocol*

* Serum	Virus Dilution Inoculation—4 Mice	Deaths by Days Following Serum-Virus Inoculation																					Survived	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		
P-331	1/10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	Immune	
	1/20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4		
	1/40	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4		
P-132	1/10	..	..	..	..	1	1	..	..	1	..	..	1	..	..	..	..	..	..	..	..	0	Not immune	
	1/20	..	..	..	..	2	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	0		
	1/40	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	2		
P-133	1/10	..	..	1	..	..	..	..	1	..	..	2	..	..	..	..	..	..	..	..	..	0	Not immune	
Neg.	1/20	..	1	..	..	..	1	..	..	1	..	..	..	1	..	..	..	..	..	..	..	0		
Control	1/40	..	..	..	..	1	..	1	..	1	..	1	..	..	..	..	..	1	..	..	..	0		
P-134	1/10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	Immune	
	1/20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	3			
	1/40	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4			
P-135	1/10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	Immune	
	1/20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4		
	1/40	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4		
P-136	1/10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	Immune	
Lennett	1/20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4		
+ Control	1/40	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4		
P-137	1/10	..	..	..	..	2	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	0	Not immune	
	1/20	..	..	..	1	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	1		
	1/40	..	..	..	..	..	..	..	1	1	..	1	..	1	..	1	..	1	..	..	..	..		

\* 0.1 cc. undiluted + 0.15 cc. various dilutions of virus held for 1 hour room temperature  
0.03 cc. of mixture inoculated intracerebrally

was clinically considered to be one of poliomyelitis, and the clinical and pathological picture in monkeys confirms this opinion. Immunologically the virus is found to be fully neutralizable with a monkey pooled poliomyelitis antiserum secured from Dr. E. H. Lennette, with antisera produced in monkeys and mice against the P.M.V. strain of virus, and against a strain recovered from Niagara Falls in 1938, and by serum from immune monkeys Nos. 91 and 53 secured through the courtesy of Dr. S. D. Kramer, while monkey No. 41 received also from Dr. Kramer was negative.

On the other hand, an antipoliomyelitis serum secured from Dr. Lloyd Aycock and one produced against a virus

recovered in 1939 from Charleston, S. C., both failed to protect against the *Lansing strain*.

The positive immunological results secured with the sera from animals experimentally inoculated with certain strains of poliomyelitis virus, together with the high incidence (71.5 per cent) of serum immunity found among 293 human sera, indicates that the *Lansing strain* of virus is immunologically a commonly occurring one whose adaptation to an inexpensive rodent host, it is hoped, may materially facilitate research in certain phases of the poliomyelitis problem.

#### REFERENCE

1. Jungeblut, C. W., and Sanders, M. *Proc. Soc. Exper. Biol. & Med.*, 44, 2:375-378 (June), 1940.

# The Local Health Officer and Military Emergencies\*

HAVEN EMERSON, M.D., F.A.P.H.A.

*Professor of Public Health Emeritus in Residence, De Lamar Institute of Public Health, College of Physicians and Surgeons, Columbia University, New York, N. Y.*

**A**N emergency is a reality appearing suddenly and calling for immediate action. By its very nature it is unpredictable in time or character, and conforms to no laws or rules of occurrence. Particularly is this true of those we qualify as military emergencies.

We may perhaps be charged with futility of words if we attempt to read into the experience of past wars lessons presumed to be helpful for national defense today. And yet, such is the inclination of the human mind that it chooses to apply its imagination to unforeseen but possible oncoming events.

Military emergencies occur in each of the four phases of the cycle from peace to war and back again to peace:

Mobilization and recruitment.

Training and assembly of troops for areas of combat or action.

Combat or other active duty of armed forces.

Demobilization of armies to civilian status.

The local health officer can hardly escape involvement to some degree in each of these unless his area of jurisdiction is unusually remote and sparsely populated.

Military emergencies affecting official health organizations will fall in the main under two major categories: those

of a sanitary nature, and those disrupting administrative routine.

The first probable emergency will be created by assembling within a health jurisdiction area, and usually at sites and in buildings inadequate for the purpose, of large numbers of young men from a wide variety of homes and communities, brought together under conditions of considerable overcrowding, fatigue, irregularity of food and cleanliness services. This process of mobilization of young men for training is likely to include unusual opportunities for exposure to bacterial and virus diseases of the upper respiratory tract, and is apt to be accompanied or preceded by increased occasion for venereal infection.

Specifically, such emergencies will express themselves as sudden increases in cases of mumps, measles, whooping cough, meningitis, the common cold, and, more rarely, of influenza and bacillary dysentery, first among recruits and then in the contiguous civilian population.

A second emergency will appear with the insidious or obvious infiltration of prostitutes, who will create a sanitary nuisance in zones surrounding military areas readily accessible to officers and men off duty. They will immediately cause social confusion with temptation and immorality in the civilian population and among the transient camp hangers-on.

---

\* Read at a Special Session on Communicable Disease Control under Wartime Conditions of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 11, 1940.



Another will be the sudden and uncontrolled establishment of a multitude of eating, drinking, and amusement places accessible to troops and their visiting friends.

A fourth, and this an administrative type of emergency, will be the disruption of existing politically defined areas of health jurisdiction, by military orders that create zones, corps and army areas inclusive of several or many civil health jurisdictions, and in this process duplicate or supersede the authority of the local health officer by setting up a military sanitary jurisdiction consistent with the need of troops in training, with in-bounds and out-of-bounds defined and enforced for troops and civilians alike by the military police.

A fifth situation likely to develop, again administrative rather than sanitary in character, is the stripping from the health department of the ablest men and women of the staff by the military demand for trained personnel familiar with the terrain or locale, and called upon to serve army needs, and to replace health personnel in larger and more important communities, already disorganized by enlistment or draft.

What the local health officer will do in the face of these emergencies must depend about equally upon the competence and understanding of the commanding officer of the military forces, the experience of his sanitary officer or surgeon of the command, and the promptness with which the latter and the local health officer collaborate to use their respective authorities and personnel in a plan of action acceptable and effective alike for the protection of both troop and civil population groups against communicable diseases.

We may assume that in any emergency involving military units, or related even remotely to their effectiveness, the military will at once if necessary supersede the civil health authority, exercising jurisdiction not

only over military but civilian populations within the area concerned. This is really the greatest administrative emergency likely to face the local health officer and the population and area he has been responsible for. Under these conditions it is essential that official liaison and continuity of essential reports and records, particularly of the notifiable diseases, and of deaths, be immediately established by personal contact between the local health officer and the medical officer of troops, and an agreement reached at once on the most productive use of the trained personnel available to both.

The records of water sources, of facilities and capacities for waste disposal, and of the licensed producers and vendors of foods, particularly of milk, will be needed by the military authority. The local health officer must learn from the medical officer of the command the amount and causes of noneffectiveness for medical reasons among the troops.

Whether or not a sanitary emergency becomes a serious hazard to health will depend chiefly upon the prior and current competence of local health service in two respects: first, the accurate, complete, and up-to-date record of all potable and non-potable and potentially usable safe water sources in the area, a record of all premises and persons permitted or licensed to produce or sell milk, and of all public eating places, and of the method and place of disposal of household, industrial, and community waste. The second test of a health officer's competence and readiness to meet likely military health emergencies will be his knowledge of the incidence of notifiable diseases in his area, of insect and other vermin nuisances, and of housing and industrial conditions which may become foci for the spread of disease.

Without these records of sanitation and disease incidence in readily available tabular and areal map form, the

local health officer will be powerless to give the assistance which the medical officer of troops will need and have a right to expect as soon as or before troops enter a previously unoccupied civil health jurisdiction.

Under ideal conditions, and in the absence of actual combat action demanding complete secrecy as to troop movements, the civil health officer should be notified in advance of the time and probable number and expected duration of stay of troops moving into his area. From the moment any body of troops enters a health area, the respective military and civil health officers must act in the closest collaboration, exchanging all pertinent information and records of sickness of a significant character.

#### MOBILIZATION AND TRAINING PERIODS

The training period, together with the sanitary problems of transportation of troops prior to combat or other active duty, presents less acute and less numerous emergencies than does the mobilization period. Hospitalization of acute respiratory disease in epidemic form is likely to be the major emergency. To supply sufficient hospital beds may mean a sacrifice of facilities ordinarily devoted to isolation of acute and chronic communicable diseases, especially tuberculosis, with corresponding disturbance of an already inadequate provision for hospital isolation of this disease. The local health officer will become the coördinator if not actually the administrator of the hospitals of his community.

#### UNITS IN ACTION

It would be fruitless if we were to attempt to list or describe emergencies connected with military combat, and services of supplies supporting units in action. There is no limit to their variety or severity, as reading of the daily papers for the past twelve months

must have convinced even the least imaginative person in the United States.

The chief safeguard and factor of administrative preparedness will always be the complete sanitary coverage of the entire area involved in troop occupation, regardless of the movement in or out of troops, and inclusive of all industrial, production, or service plants or facilities for transport. The unit of permanent sanitary control in war is not population but area. Perhaps one should say that since troops constitute a self-sufficient sanitary unit, the area health control will supplement that of troops and be effective, whatever the character or amount of the population shift that may occur, at one time the area being almost vacant, at another crowded unavoidably and beyond the limits of sanitary safety.

The most urgent emergency facing any military medical authority during combat or other active period of troops is a sudden extensive increase in their noneffective rate because of sickness. To make and keep the noneffective rate of troops at the minimum must be the first consideration of both military and civil health authority, and almost any sacrifice of other objectives may be justified to this end.

#### DEMobilIZATION

The phase of demobilization should present only rare and minor emergencies involving the local health officer, since under any orderly release of men from military service the medical certification of their condition should be complete and give entire assurance of freedom from communicable disease. The widespread and relatively gradual redistribution of demobilized men to their homes differs little from the movement of the general civil population, and men who have had the medical protection and instruction of military service may be considered as assets and not lia-

bilities for any civil population to which they return.

#### ENVIRONMENT

From the experience of military medical officers it appears that it is the neglect of record and remedy of the most elementary factors of environment by local health officers that leads to or permits emergencies involving troops.

*Now* is the time to prevent emergencies jointly involving civil and military medical jurisdictions. Fundamental sanitary knowledge demands detection and abatement of sanitary nuisances as this term is technically and precisely used. I do not mean esthetic offenses to sight, hearing, or smell that often masquerade as health hazards and divert attention from the real dangers in water, milk, foods, sewage, housing, and industrial conditions.

Two features of military movements today must be constantly kept in mind by the local health officer. One is the rapidity of transport and the resulting great distances covered in a day's march of motorized land and aerial transportation, and the other is the mushroom growth of living, working, and recreational premises in the immediate vicinity of training camps.

Only by the closest and most coöperative liaison between the local health officer and the medical officer of troops can emergencies due to these factors be avoided or met. This coöperation must be not merely that of officialdom, and the formalities of the entrenched and congenital bureaucrat, but must reveal professional initiative and personal enthusiasm and imagination. It must go far beyond the immediate and obvious, and include all the potentialities of health promotion to keep the armed forces at their maximum of effectiveness without loss of protection to the civilians of the area.

Whole states and a multitude of local health jurisdictions will be crossed in

twenty-four hours by very large bodies of troops, and as they pass through, each local health officer must be on guard and available if not actually in personal touch with the medical officer of the military unit for any action or local information that may be needed. For much of this, the state health department will provide the liaison.

The following quotation from an army medical inspector of present authority and with a wide experience gives a glimpse into the relationship desired and expected between military and civil officers in charge of sanitation:

My own experience in the training and manoeuver areas during the past year as Army Medical Inspector has been that the local health officer plays a very important rôle in protecting the health of the troops. Actually he inspected or supervised the inspection of public eating places, road-houses, "honky-tonks," and other places of similar nature frequented by troops off duty; he submitted reports as to the potability of various water supplies throughout the area; he saw that I was constantly advised relative to health conditions in the training area and throughout the state.

The Army, as well as civil sanitary codes, requires the immediate notification of communicable diseases, and the local health officer will be well advised if he makes contact with the pathologist of any army hospital or medical formation in his area, for through his hands pass much of the earliest and most exact information as to causes of diseases and deaths. The medical officer of troops must keep civilian health officers in his vicinity informed as to the usual notifiable diseases in his unit, and of any sanitary or epidemiological facts of significance.

To point my general remarks, let me relate briefly some of the emergencies which I had an opportunity to observe at firsthand:

#### EMERGENCIES DURING THE WORLD WAR

1. Within forty-eight hours of the outbreak of the World War in 1914 the Health Depart-

ment of New York City was called upon by foreign nations for all its reserve supply of immunizing and therapeutic sera.

2. Thirty-five hundred horses died of an epizootic in a low clay bottom land in a British sector. Their burial created an emergency. The methane gas from their buried decomposing bodies was used as fuel for almost eighteen months.

3. An outbreak of scarlet fever of unusual type was reported in midsummer from our troops in the Vosges. The symptoms were well explained when it was learned that all the patients had eaten generously of the berries of the wild belladonna plant, mistaking them for our common blueberry.

4. Hundreds of cases of a very severe 3 day fever were reported from Blois, which required the rare clinical and laboratory judgment of Col. Hans Zinsser to distinguish from meningitis and influenza.

5. Widespread sporadic cases of typhoid in a motor transport corps was explained by the discovery that at their central camp near Marseilles they had violated orders by drinking from a pellucid clear but non-potable local brookwater. The camp hospital had reported the cases as intestinal flu. The diagnosis of typhoid was revealed by the pathologist at Dijon, who reviewed the autopsy protocols from the camp hospital.

6. During the Chateau Thierry offensive 150,000 cases of bacillary dysentery developed among our troops. A handful only reached hospitals, for recovery in 3 days was usual. The origin of the infection was the hillside smeared with German feces over which our troops pushed the enemy in retreat.

#### COMMON COMMUNICABLE DISEASES

To keep your sense of proportion and of the permanence of our belligerency against the common communicable diseases even in war let me quote a few notes from the first and last of the 60 weekly bulletins of the Chief Surgeon's office of the A.E.F.

*April 17, 1918. No. 1*

"Between April 1st and 14th there have been reported from the A.E.F. the following number of cases of various communicable diseases:

Chicken pox ....	5	Meningitis .....	27
Diphtheria .....	110	Scarlet fever ...	114
Dysentery .....	2	Smallpox .....	2
Measles .....	43	Typhoid .....	4
		Anthrax .....	3

"The incidence rates for diphtheria, scarlet fever, and meningitis are higher per 100,000 troops in the A.E.F. than at any time since January 1, 1915, in the B.E.F. There have been epidemics of diphtheria and scarlet fever among a number of organizations in the 32nd division.

"The cases of meningitis have been distributed without any evidence of epidemic foci. The occurrence of a number of cases of chicken pox among colored troops would suggest that mild smallpox is being overlooked and is being reported as chicken pox, a relatively rare disease in adults.

"One death occurred from small pox in an officer exposed to the disease while convalescing from mumps in a hospital. He had not been protected by recent vaccination.

"Two deaths from anthrax have occurred; in one of them the diagnosis up to the day of death was 'cellulitis of the neck following vaccination on the arm.' The other was diagnosed and treated as meningitis, and not until the time of autopsy was the diagnosis of anthrax septicemia established."

*June 2, 1919. No. 60. Final number*

"There have been reported in the A.E.F. including troop units in Italy and Russia, 1,418 cases of typhoid (1,248) and paratyphoid (170) fevers with 155 and 3 deaths respectively, between August, 1917, and May, 1919, inclusive.

#### Weekly Review

"There has been an increase during the past week of 7 cases of diphtheria, 2 cases of measles, 9 cases of meningitis, and 4 cases of typhoid fever. Of 9 cases of typhoid reported only 4 were proved cases. The venereal disease rate has risen considerably due to especially high incidence discovered in detached negro labor troops, recently assembled and thoroughly examined before embarkation.

"The annual venereal disease rate for the week ending May 21, 1919, per 1,000 troops for the A.E.F. was 56.08. The total non-effective rate was 2.69 per cent; from venereal diseases included 0.49 per cent.

"The following cases of certain communicable diseases were reported during the week ending June 1, 1919:

Chicken pox ...	7	Meningitis .....	12
Diphtheria .....	30	Paratyphoid ...	1
Dysentery .....	2	Scarlet fever ...	6
Measles .....	13	Typhoid .....	9
		Smallpox .....	2

Sometimes emergencies occur as a long series of consecutive events, such as the 6 weeks of emergencies created by the development of typhoid fever among 68 members of a replacement draft of 250 men as they travelled from Camp Cody, Texas, through Camp Merritt, New Jersey, overseas by transport at Liverpool on disembarking, at Southampton in a rest camp, at Cherbourg, France, in transit and finally at the replacement, assembly and training camp at St. Aignan where all but 2 of the 11 deaths occurred. A barrel of water polluted at source or by an unknown carrier, a common cup on a string nailed to the barrel in a box car from Texas to New Jersey; no officers travelling with the replacement draft; eagerness of troops to get overseas in spite of early symptoms which were minimized; and undue confidence in unlimited protection by typhoid vaccine

were among the factors of causation. All of the affected draft had been vaccinated, and no troops travelling with the infected men developed the disease.

#### CONCLUSION

In conclusion, let me say that for the prevention of military emergencies in the future, the local and state health officers must now make sure that they have complete record of all facts of sanitary importance in their areas, and keep these records up to date at all times; and that they insist upon complete reporting of notifiable diseases and use this information for effective control, and provide for liaison with the medical officer of any military unit entering their area, from whom they must expect equally complete information as to sanitary status and communicable diseases among the troops.

# Observations on Fecal Examinations in Poliomyelitis\*

JAMES D. TRASK, M.D., AND JOHN R. PAUL, M.D.

*Associate Professor of Pediatrics; and Professor of Preventive Medicine,  
Yale University School of Medicine, New Haven, Conn.*

IN 1912 Kling, Pettersson, and Wernstedt<sup>1</sup> obtained the virus of poliomyelitis in material from the human intestine and in 1915, Sawyer<sup>2</sup> corroborated this finding. However, these observations lay fallow for 22 years until Harmon,<sup>3</sup> in 1937, reported 6 positive tests with colonic washings from 5 of a series of 20 poliomyelitics. Since then routes of inoculation other than the cerebral have been reemployed and many observers<sup>4-11</sup> have found the virus in human stools. Recently Howe and Bodian<sup>14</sup> have simplified fecal examinations and apparently have made the tests more delicate by utilizing the mere nasal instillation of untreated feces. With this method they reported success in 10 of 14 tests; all of 7 samples collected in the first week of the disease being positive.

In stools the virus is active and stable. It appears in abortive as well as in paralytic poliomyelitis; that is, in the common as well as in the classical forms of the disease. Convalescent carriers and healthy carriers have been described.<sup>5, 8, 10</sup> Virus has been demonstrated in sewage,<sup>12, 12a</sup> and chemical methods of concentration have been

devised<sup>13</sup> which are applicable to the sampling of sewage.

## EPIDEMIOLOGY

### *Nasopharynx vs. intestines*

Although the virus may also be detected in nasopharyngeal washings, it has been found more readily in stools, and it seems more persistent in the intestinal tract than in the nose.

A schematic comparison of the relative importance of nasopharyngeal washings and of stools as a source of poliomyelitic virus is shown in Figure 1. The figure is marked off in weeks for emphasis which hides the fact that by far the largest proportion of positive results from the nose were obtained in the first 48 hours of the disease. In contrast to this, virus may be found in stools commonly for days and weeks, and occasionally for months. In fact, a convalescent carrier has been described who harbored the virus for 100 days or more.<sup>8</sup>

### *Stools may be used in case finding*

The usual form of human infection in poliomyelitis consists in abortive attacks. These have no single distinctive feature and can be recognized only during epidemics or by animal inoculation. They are characterized as minor febrile episodes which affect chiefly the children of a household in which there is a

\* From the Yale University School of Medicine. Aided by a grant from the National Foundation for Infantile Paralysis, Inc. Read at a Joint Session of the Laboratory and Epidemiology Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

# TESTS FOR POLIOMYELITIC VIRUS IN NASOPHARYNGEAL WASHINGS AND IN STOOLS IN VARIOUS WEEKS OF POLIOMYELITIS

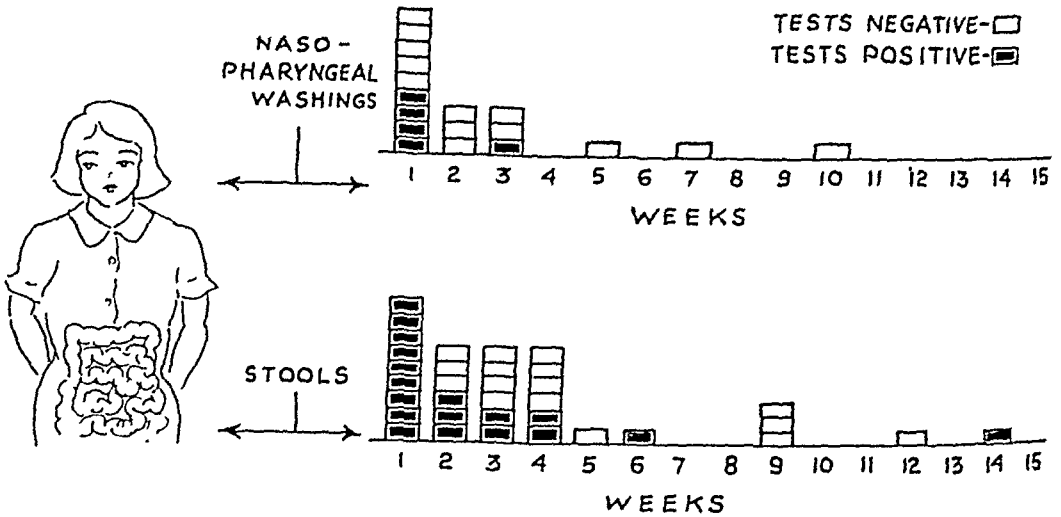


FIGURE 1—Schematic representation of results of tests for the virus which shows the superiority of stools over nasopharyngeal washings, and which indicates that stool examinations may be the more valuable for case finding

## ABORTIVE CASES OF POLIOMYELITIS ARE MILD AND ACT AS HEALTHY CARRIERS

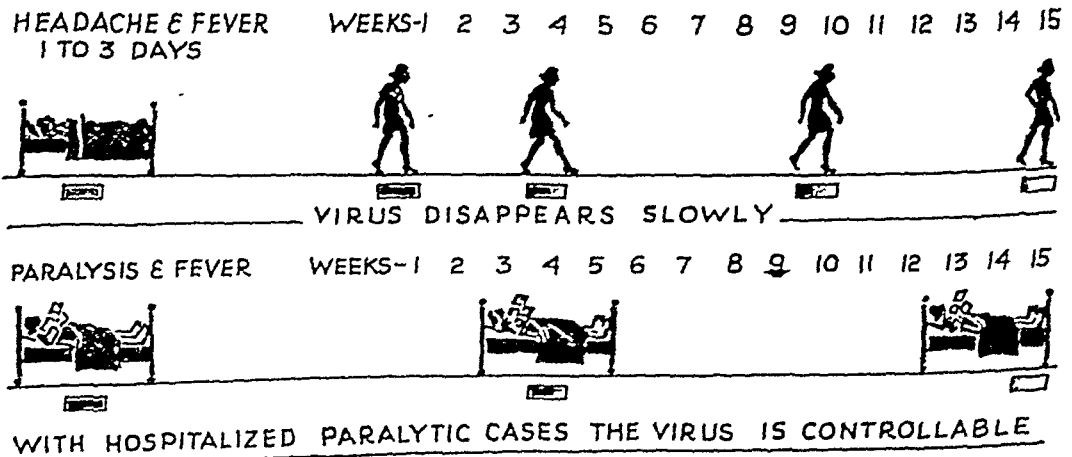


FIGURE 2—Hygienic implications of abortive poliomyelitis which furnishes many mobile convalescent intestinal carriers of the virus

frank case with paralysis.<sup>15</sup> The following are the symptoms: fever, lassitude, headache, vomiting, sore throat.

By animal inoculation the virus may be recovered from abortive poliomyelitis in nasopharyngeal washings collected early in the disease<sup>16, 17, 5</sup> or, more readily it may be found in the stools<sup>4, 18</sup> for weeks or for even months,<sup>8</sup> and thus the latter test may be useful for diagnosis. It seems important that virus has been found with greater frequency in individuals under 5 years of age than in those older.<sup>11</sup>

Some hygienic implications of the abortive cases are illustrated in Figure 2 which is arranged to show that, while the paralytic case is immobilized frequently in a hospital bed or at home, other children may have had the abortive form of the disease. Such children may be sick for a day or so and run around freely as convalescent carriers for weeks or months.

#### *Sewage*

During the summer and fall of 1939 poliomyelitic virus was detected in sewage in two urban epidemics, those at Charleston, S. C., and Detroit, Mich. Four positive samples were collected in close relation to isolation hospitals. In addition, one sample of domestic sewage collected in Buffalo gave a suggestive test. As the epidemics subsided negative results were obtained with samples collected from all these sites and from many other urban and domestic samples collected in the epidemic areas.<sup>12</sup> To continue the study we have been testing samples of sewage from New Haven and from New York each month since February, 1940. Occasionally pathogenic bacteria have been encountered. With three samples the monkeys have developed tuberculosis of the omentum. This is unusual as the chief tuberculous lesion in monkeys, and as the animals were inoculated intra-abdominally it is likely that there were viable tubercle

bacilli in these 20 cc. samples of raw sewage.

The positive results with poliomyelitic virus are an index of the large amount of virus which sewage may contain, and they point to our grossly contaminated waterways as a natural source of virus. Indeed, the magnitude of its distribution makes one hesitant in accepting the direct infectivity of the virus. It might well be that another cycle, with passage through a non-human host, for example, is necessary before the virus could become infective for man again. At any rate, in polluted waterways there is a great natural source of virus to which many forms of life are exposed besides man.

#### *Contaminated water*

It is to be remembered that there are many methods of transmitting experimental poliomyelitis in the monkey, and that this may also hold for man. Among the experimental routes is the gastrointestinal tract. This raises the question as to whether poliomyelitis may be water-borne. The possible importance of contaminated water rests on the intestinal features of poliomyelitis; its summer prevalence; and the production of poliomyelitis by feeding experimentally contaminated food. However, epidemiological teaching considers water-borne epidemics to be unlikely because the distribution of cases is generally at variance with the idea. The situations where the incidence of poliomyelitis is highest are in rural epidemics, and a typical locus where the disease flourished is illustrated in Figure 3. There are children, verdure, domestic animals, birds and insects. Also there is open water and there is freshly broken ground. A rural community, such as this, may have an explosive outbreak with an incidence of infection many times that encountered in the most severe urban epidemics. But generally farms have their own water supply, and





FIGURE 3—The setting of a rural outbreak of poliomyelitis in western Connecticut in 1939. The healthy children include one convalescent carrier following a missed attack of abortive poliomyelitis; after 3 weeks virus was detected in his stools. The picture is a reminder that many living things besides man may come in contact with the virus.

we must conclude that most epidemics are not water-borne *in the usual enteric sense*. However, polluted water may be important in some other way as yet undisclosed. For beginning with Caverly<sup>10</sup> in 1894, epidemics have been described which were in relation to river valleys. Last year we observed an example of this in Connecticut and identified some cases by demonstrating virus in their stools.<sup>20</sup> In Sweden, the terrain is such that water courses and lines of human traffic are sufficiently divergent so that a relation between poliomyelitis and lakes or rivers is accepted by at least one authority.<sup>4</sup> Epidemics have spread up as well as down river valleys.

#### PROPHYLAXIS

##### *Chlorination*

Data on the chemistry of the virus indicate that it may be highly susceptible to oxidizing agents, and the early work showed that it was inactive after

chlorination, but the dosage and duration of contact were beyond practical limits.<sup>21</sup> The subject has been approached again, and in a recent paper Kempf and Soule<sup>22</sup> reported that dosages of chlorine as high as 0.5 p.p.m. and exposures of 1 hour were ineffective. In our own experiments with chlorine we have been impressed with the differences exhibited by two strains; one was highly susceptible while the other was quite resistant to chlorine. Infected monkey cord was our source of virus as it was in the study of Kempf and Soule. The resistance of monkey cord to chlorine is of considerable academic interest, but for practical reasons it is of less immediate importance than the question of the effect of chlorine on human feces containing native virus. We have run one experiment on the chlorination of patients' feces; unfortunately the controls were irregular.

### Problems of control

What should a health officer advise as a measure of control when poliomyelitis visits his community? It seems unlikely that quarantine restriction can be placed effectively on what must be our greatest human source of virus; namely, convalescent abortive cases. No practical method of handling these children is obvious because they are so numerous and because laboratory control is not feasible.

How should human excreta be treated? Is it in rural communities or with urban sewage that effort should be expended to control the virus from the intestinal tract? Virus must enter our waterways, and theoretically, at least, polluted water might furnish a natural reservoir of virus for the contamination or infection not only of man but also of all forms of life. Formerly insects were excluded as possible vectors because the virus is not found in the blood stream. Now, with more knowledge of the cutaneous infectivity of certain strains of poliomyelitic virus,<sup>23</sup> and with the existence of large amounts of virus in nature, insects cannot be excluded from consideration. Furthermore, it is well to bear in mind that birds appear to play a part in equine encephalomyelitis<sup>24</sup> which is another summer viral disease of the central nervous system. Also it is pertinent to state that Shope<sup>25</sup> found that infected worms may be active in the overwintering of epidemic swine influenza.

Consequently it is not evident that the presence of poliomyelitic virus in sewage is a direct or even an indirect link in the chain which usually or even occasionally leads this infectious agent from one person to another. We know merely that under certain conditions it is there, and we believe that the circumstantial evidence, at least, makes a good case for the extra human host. Therefore until more knowledge is available on this complex subject it seems unwise

for the health officer to introduce new methods of control.

### SUMMARY

New facts about poliomyelitis are available, and they are largely concerned with the intestinal features of the disease. This is encouraging to those who attach significance to the frequency of summer outbreaks.

As yet the new information has not led to the formulation of any practical rules for control. However, the virus has been shown to be widely distributed and relatively stable.

Experimental methods, long so closely restricted to problems of laboratory poliomyelitis, can now be applied more directly than before to epidemiological problems of the natural disease.

### REFERENCES

1. Kling, C., Pettersson, A., and Wernstedt, W. *Communications Inst. méd. Etat Stockholm*, 3:5, 1912.
2. Sawyer, W. A. An Epidemiological Study of Poliomyelitis. *Am. J. Trop. Dis. & Prev. Med.*, 3:164, 1915.
3. Harmon, P. H. (Discussion of article by Toomey, J. A.) Active and Passive Immunity and Portal of Entry in Poliomyelitis. *J.A.M.A.*, 109, 6: 406 (Aug. 7), 1937 and personal communication.
4. Kling, C. Recherches sur l'épidémiologie de la poliomyélite. *Acta Soc. Med. Suecanae*, 55, 1:23, 1929.
5. Trask, J. D., Vignec, A. J., and Paul, J. R. Poliomyelitis Virus in Human Stools. *J.A.M.A.*, 111:6 (July 2), 1938.
6. Kramer, S. D., Hoskwith, B., and Grossman, L. H. Detection of the Virus of Poliomyelitis in the Nose and Throat and Gastro-Intestinal Tract of Human Beings and Monkeys. *J. Exper. Med.*, 69, 1:49 (Jan.), 1939.
7. Kling, C., Olin, G., Magnusson, J. H., and Gard, S. Nouvelles Recherches sur l'élimination du Virus Poliomyélique par les Matières Fécales. *Bull. Acad. de méd., Paris*, 121:826 (June 13), 1939.
8. Lépine, P., Sédallian, P., and Sautter, V. Sur la Présence du Virus Poliomyélique dans les Matières Fécales et sa Longue Durée d'Élimination chez un Porteur Sain. *Bull. Acad. de méd., Paris*, 122:141 (July 18), 1939.
9. Howe, H. A., and Bodian, D. Production of Experimental Poliomyelitis from Untreated Stools. *Proc. Soc. Exper. Biol. & Med.*, 41, 2:538 (June), 1939.
10. Kramer, S. D., Gilliam, A. G., and Molner, J. G. Recovery of Virus of Poliomyelitis from Stools of Healthy Contacts in Institutional Outbreaks. *Pub. Health Rep.*, 54:1914 (Oct.), 1939.
11. Trask, J. D., Paul, J. R., and Vignec, A. J. I. Poliomyelitis Virus in Human Stools. *J. Exper. Med.*, 71, 6:751 (June), 1940.
12. Paul, J. R., Trask, J. D., and Gard, S. II. Poliomyelitic Virus in Urban Sewage. *J. Exper. Med.*, 71, 6:765 (June), 1940.

12a. Foreign Letters. Poliomyelitis Virus in Sewer Water. *J.A.M.A.*, 114, 22:2232 (June 1), 1940.

13. Gard, S. III. Method for Detecting Poliomyelitic Virus in Sewage and Stools. *J. Exper. Med.*, 71, 6:779 (June), 1940.

14. Howe, H. A., and Bodian, D. Untreated Human Stools as a Source of Poliomyelitis Virus. *J. Infect. Dis.*, 66:198 (May-June), 1940.

15. Paul, J. R., Salinger, R., and Trask, J. D. Studies on the Epidemiology of Poliomyelitis. I. Methods and Criteria for the Detection of Abortive Poliomyelitis. II. The Incidence of Abortive Types of Poliomyelitis. *Am. J. Hyg.*, 17, 3:587 (May), 1936.

16. Taylor, E., and Amoss, H. L. Carriage of the Virus of Poliomyelitis, with Subsequent Development of the Infection. *J. Exper. Med.*, 26:745 (Nov.), 1917.

17. Paul, J. R., and Trask, J. D. The Detection of Poliomyelitis Virus in So-called Abortive Types of the Disease. *J. Exper. Med.*, 56, 3:319 (Sept.), 1932.

18. Vignec, A. J., Paul, J. R., and Trask, J. D. The Recovery of the Virus of Poliomyelitis from Extra-Neural Sources in Man, with a Survey of the Literature. *Yale J. Biol. & Med.*, 11, 1:15 (Oct.), 1938.

19. Caverly, C. S. Preliminary Report of an Epidemic of Paralytic Disease, Occurring in Vermont, in the Summer of 1894. *Yale M. J.*, 1:1, 1894. Also in: *Infantile Paralysis in Vermont, 1894-1922*, a Memorial to Charles S. Caverly, 1924.

20. Paul, J. R., and Trask, J. D. Poliomyelitic Virus in Stools and Sewage. *J.A.M.A.*, 116, 6:493 (Feb. 8), 1941.

21. International Committee for the Study of Infantile Paralysis. *Poliomyelitis*. 1932, pp. 52-54.

22. Kempf, J. R., and Soule, M. H. Effect of Chlorination of City Water on Virus of Poliomyelitis. *Proc. Soc. Exper. Biol. & Med.*, 44, 2:431 (June), 1940.

23. (a) Howitt, B. F. A Recently Isolated Strain of Poliomyelitic Virus. *Science*, 85:268 (Mar. 12), 1937.

(b) Trask, J. D., and Paul, J. R. The Skin Infectivity of Poliomyelitic Virus. *Science*, 87:44 (Jan. 14), 1938.

24. Fothergil, L. D., and Dingle, J. H. Fatal Disease of Pigeons Caused by Virus of Eastern Variety of Equine Encephalomyelitis. *Science*, 88:549 (Dec. 9), 1938.

25. Shope, R. E. An Intermediate Host for the Swine Influenza Virus. *Science*, 89:441 (May 12), 1939.



outbreaks caused by cream-filled baked goods and a toxin was demonstrated in 3 of these. In one, *Staphylococcus albus* was isolated, and in 3, staphylococcus, type not designated. In 4, the baked goods believed responsible were not available for laboratory examination. However, in each of the latter outbreaks the onset of symptoms within  $3\frac{1}{2}$  hours of eating the food indicated that the illness was due to a toxin.

It is the common opinion among bakers and apparently others that it is unwise to manufacture chocolate eclairs and cream puffs during the hot summer months. However, the New York State Department of Health records show no special high incidence during the summer months in the 17 outbreaks. Only 6 occurred in the period from June 1 to September 30, and at least 1 occurred during each of the 12 months, with the exception of July. (See Table 1.)

first of these occurred on April 30, 1936, and consisted of 6 cases in an Albany manufacturing plant following eating of chocolate eclairs; the second was May 23, 1937, consisting of 5 cases due to a strawberry cream pie in a family in Troy, N. Y. The next one, June 1, 1937, produced 12 cases in Troy, also due to strawberry cream pies. The fourth outbreak occurred on June 9 of the same year and was responsible for 3 cases due to cocoanut cream pie in Rensselaer City. The fifth outbreak was responsible for 16 cases in Troy and vicinity and for 9 in Columbia County, some forty miles distant from the bakery. During one of the earlier outbreaks, that of June 1, 1937, nose and throat cultures were taken from the employees of the bakery. The laboratory isolated *Staphylococcus aureus*, with the characteristics of those frequently associated with food poisoning, both from a specimen of the implicated strawberry

TABLE 1

*Reported Cream-filled Baked Goods Outbreaks from 1935 to 1939 in Upstate New York*

Date	Location	Number of Cases	Suspected or Incriminated Food	Hours Incubation Period	Causative Organism
1/26/35	Auburn	200	Choc. Eclairs	2½	<i>Staph. Aureus</i>
4/23/35	Westchester County	700	Choc. Eclairs & Cream Puffs	1-4	<i>Staph. Aureus</i>
6/30/36	Albany	8	Choc. Eclairs	2-4	<i>Staphylococcus</i>
9/19/36	Endicott & Johnson City	150	Cream Puffs	2-4	<i>Staphylococcus</i>
3/ 5/37	Bayshore, L. I.	13	Choc. Eclairs & Cream Puffs	Within 6	<i>Staph. Albus</i>
4/24/37	Rochester	50	Cream Filled Pastry	3	<i>Staphylococcus</i>
5/23/37	Troy	7	Strawberry Cream Pie	3	No Specimen
6/ 2/37	Troy	15	Strawberry Cream Pie	1-4	<i>Staph. Aureus</i>
6/ 9/37	Troy	5	Cocoanut Cream Pie	½-1	No Specimen
8/ 2/38	Seneca Falls	2	Cream Pie	3½	No Specimen
8/ 6/38	Plattsburg	5	Cocoanut Cream Pie	1	<i>Staph. Aureus</i>
10/23/38	Newfild Town	2	Cream Puffs	3½	<i>Staph. Aureus</i>
10/23/38	Newburgh	40	Choc. Eclairs	2½-3	<i>Staph. Aureus</i>
11/ 2/38	Poughkeepsie	5	Custard Pie	1-3	No Specimen
11/ 8/38	Hudson	9	Cream Puffs	4	<i>Staph. Aureus</i>
2/ 5/39	Gloversville	10	Cream Puffs	Short	<i>Staph. Aureus</i>
11/28/39	Troy	25	Choc. Eclairs	3¾	<i>Staph. Aureus</i>

Five of the gastrointestinal outbreaks due to cream-filled baked goods were traced to a single bakery in the Albany District. It is interesting to note that although many bakeries in the Albany district manufacture cream-filled pastries, all outbreaks in the district caused by these products in a 5 year period were traced to this one concern. The

cream pie and from a nose culture from the proprietor.

The most recent outbreak is a good example of the usual history. On November 30, the local health officer reported 4 cases of acute gastroenteritis among the employees of a local store who a few hours before had eaten chocolate eclairs coming from the Z.

TABLE 2

*Cases of Gastroenteritis in Troy, N. Y., and Columbia County Due to Chocolate Eclairs*

Case	Sex	Age	Time and Date of Onset	Hours Incubation Period	Symptoms	Remarks
Nov. 28, 1939						
P. K.	M	13	8:45 p.m.	2¾	Cramps, diarrhea, and vomiting	Eclairs from lot baked 11/28/39—eaten 6 p.m. same day
Mrs. F. K.	F	30	11:30 p.m.	5½	Cramps, diarrhea, and vomiting	Eclairs from lot baked 11/28/39—eaten 6 p.m.
B. K.	F	15	10 p.m.	4	Cramps and diarrhea	Eclairs from lot baked 11/28/39—eaten 6 p.m.
R. K.	F	20	10 p.m.	4	Cramps, diarrhea, and vomiting	Eclairs from lot baked 11/28/39—had dinner with Mrs. K.
S. B.	F	19	4 p.m.	3¾	Severe vomiting, diarrhea, and cramps lasting 24 hrs.	2 Eclairs from lot baked 11/28/39—eaten 12:10 p.m.
I. B.	F	25	4:30 p.m.	4¾	Vomiting and diarrhea	1 Eclair from lot baked 11/28/39—eaten 12:10 p.m.
H. G.	M	35	6:30 p.m.	6½	Mild nausea only	Eclairs from lot baked 11/28/39—eaten at noon same day
J. F.	M	30	7 p.m.	1½	Cramps, diarrhea, and vomiting lasting 6 hours	Eclairs from lot baked 11/28/39—eaten at 5:30 p.m.
D. B.	M	45	7 p.m.	4½	Anorexia, nausea, headache only	1 Eclair from lot baked 11/28/39—eaten at 2:30 p.m.
Mrs. A. M.	F	?	7:30 p.m.	1½	Cramps, nausea, and diarrhea	1 Eclair from lot baked 11/28/39—eaten approximately at 6 p.m.
G. M.	M	?	8:30 p.m.	2½	Cramps, nausea, and diarrhea	1 Eclair from lot baked 11/28/39—eaten approximately at 6 p.m.
J. C.	M	10	11 p.m.	4½	Cramps, diarrhea, and vomiting	Eclairs from lot baked 11/28/39—eaten at approximately 6:30 p.m.
L. H.	M	55	1:20 p.m.	3	Cramps, diarrhea, and vomiting lasting approx. 12 hrs.	Eclairs from lot baked 11/29/39—eaten 10:20 a.m. 11/29/39
B. W.	F	32	Nov. 29, 1939 12:00	5	Vomiting, diarrhea, and cramps	1 Eclair from lot baked 11/29/39—eaten at 7 p.m.
R. W.	M	9	12:00	5	Vomiting, diarrhea, and cramps	1 Eclair from lot baked 11/29/39—eaten at 7 p.m.
Mrs. E. D.	F	31	?	?	Abdominal pain, vomiting, and diarrhea	1 Eclair of lot baked 11/29/39—eaten at unknown hour
Nov. 30, 1939						
W. T.	M	67	3 p.m.	3	Abdominal pain, vomiting, and diarrhea	1 Eclair of lot baked 11/29/39—eaten at 12 noon 11/30/39
R. S.	M	24	4 p.m.	2	Abdominal pain, vomiting, and diarrhea	2 Eclairs of lot baked 11/30/39—eaten at 2 p.m.
K. Z.	F	5	6:30 p.m.	1½	Projectile vomiting and diarrhea	1 Eclair from lot baked 11/30/39—eaten at 5 p.m.
C. B. F.	M	65	7 p.m.	1	Abdominal pain, vomiting, and diarrhea	1 Eclair from lot baked 11/30/39—eaten at 6 p.m.
F. M.	F	13	7:30 p.m.	Approx. 1½	Abdominal pain, vomiting, and diarrhea	1 Eclair from lot baked 11/30/39—eaten 6 p.m.
C. M.	F	6	7 p.m.	Approx. 1½	Abdominal pain, vomiting, and diarrhea	1 Eclair from lot baked 11/30/39—eaten 6 p.m.
R. M.	M	21	7:15 p.m.	Approx. 1½	Abdominal pain, vomiting, and diarrhea	1 Eclair from lot baked 11/30/39—eaten 6 p.m.
J. M.	M	49	12:00	6	Abdominal pain, vomiting, and diarrhea	1 Eclair from lot baked 11/30/39—eaten 6 p.m.
J. K.	M	32	12:00	1	Abdominal pain, vomiting, and diarrhea	2 Eclairs of lot baked 11/30/39—eaten 11 p.m.

bakery. Inquiry at the store disclosed 6 other cases which had occurred on the preceding two days, and further investigation resulted in finding 15 additional cases. All had eaten Z bakery eclairs from lots baked on November 28, 29, or 30. The Z bakery made a specialty of chocolate eclairs, about 80 dozen of which were prepared daily for distribution in four counties in New York State and in the vicinity of Pittsfield, Mass.

A list of the distribution centers, delivery routes, and stores, was obtained, and all places were notified by telephone or personal visit or both not to distribute the products on hand and to inform the local health officers of suspicious cases. The public was advised by radio and items in the local newspapers not to consume cream-filled baked goods from this bakery, and to report any illness following the previous eating of such goods. All cream-filled pastries still remaining in the bakery and all those returned by the various delivery men were destroyed. The proprietor was instructed as to the precautions to be taken if the bakery was to continue making cream-filled pastries. Although not legally required, the bakery closed. However, within a few weeks, the individuals concerned incorporated under a new name and opened a bakery at a new location.

The illness was characterized by severe abdominal pains, nausea, vomiting, and diarrhea. Most of the patients were violently ill for a few hours but recovered promptly. The longest duration of illness was 24 hours. The average period between eating the eclairs and the onset of symptoms was 3.2 hours for 24 of the 25 patients for whom a fairly accurate incubation period could be calculated. The shortest period was 1 hour and the longest 6½ hours (see Table 2). Although illness was caused by portions of three lots of 80 dozen each, or approximately 3,000

eclairs, which were distributed widely in an area within a forty or fifty mile radius of the bakery, careful investigation failed to discover cases in areas other than two rather sharply localized communities, *i.e.*, the City of Troy and vicinity, and a small locality in the vicinity of Hudson in Columbia County. However, in the areas where cases occurred, the incidence was high among those eating the eclairs. This suggests that only a part of each batch of cream filling was contaminated.

Inquiry was made as to the method employed in the preparation of the eclairs. The cream filling was made from the usual formula and consisted of milk, sugar, starch, eggs, salt, and vanilla. The milk and sugar were mixed and brought to a boil. The eggs were beaten and then mixed with the starch and added to the boiling milk and sugar. Salt and vanilla were then added. This mixture was poured into several 2 gallon containers which were placed on the floor of the unheated supply room and allowed to cool, standing from about 9:00 p.m. until 1:00 a.m. the following morning, when the cream filling was poured into a large mechanical cream puff filler (Figure 1). The pastry shells previously prepared were filled, one at a time, by impinging the shell upon the nozzle of the filler by hand. As the pastry shell struck a guard on the nozzle the plunger with attached piston forced the desired amount of cream fill into the eclair. This process usually took about an hour. The eclairs were then sprayed with chocolate frosting, and allowed to remain at room temperature until deliveries, which were usually started at 7:00 a.m. and completed at noon. It is apparent that the period between preparing the mix and the delivery of the eclairs allowed ample time for the development of toxins.

The premises of the Z bakery on inspection were found to be far from

clean. Food and dirt were found behind all the heavier pieces of furniture. Mice and rat droppings were abundant in corners and out of the way places. Parts of the mechanical filler not easily accessible had not been well cleaned.

Nose, throat, and stool specimens were submitted to the State Laboratory from all employees of the plant who were inspected for evidence of skin lesions and respiratory infections. The proprietor was found to have burns, some of them secondarily infected, on his hands and arms. His son had a purulent infection on the fourth finger of his right hand. It was the latter's duty to pour the cooled cream fill into the mechanical filler and to handle each eclair in the filling process. Due to the fact that this individual had ample opportunity to contaminate the ma-

terial, the lesion on his finger was cultured. Samples of eclairs baked on each of the three days under suspicion were also submitted to the laboratory, some of them obtained from the homes in which cases had occurred.

The majority of the nose and throat cultures showed *Staphylococcus aureus* and *albus*. The cultures from the proprietor's son's finger and cultures taken from the nozzle and base of the filling machine showed almost pure cultures of *Staphylococcus aureus*. A batch of food containing cultures of the strains of *Staphylococcus aureus* from the wound on the proprietor's son's finger, and from the eclair filling was prepared and fed to cats. After eating, these test animals vomited and had diarrhea.

The legal requirements in the state for the production of baked goods are

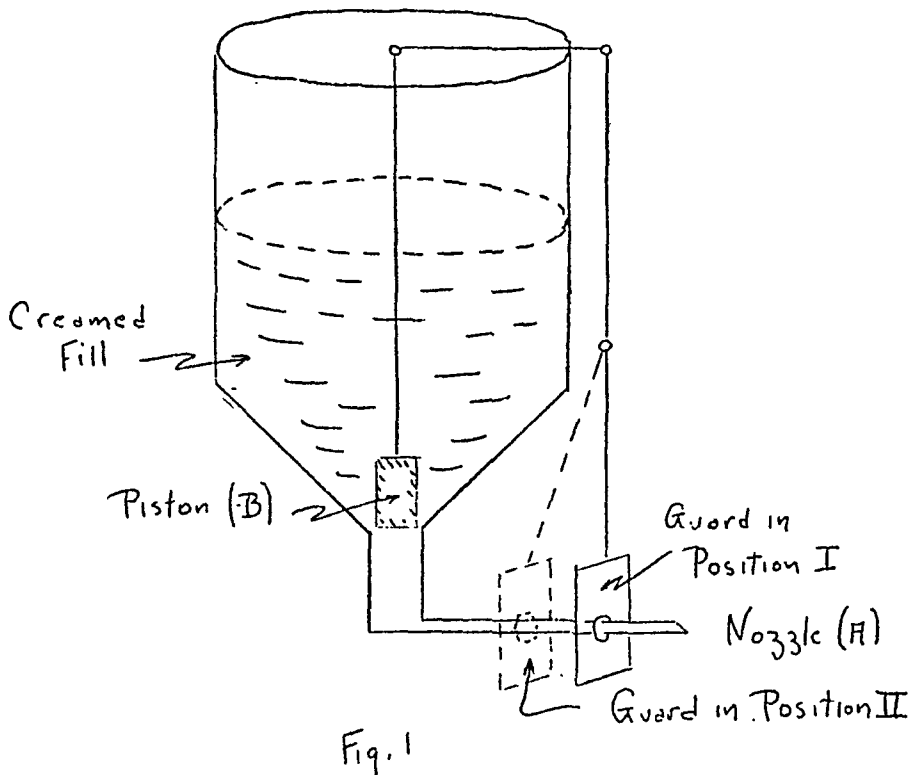


Diagram of Method of Filling Pastry Shells in the Zampier Bakery at Troy, N. Y. No Scale.

Pastry is impinged on nozzle (A) forcing guard from position I to position II. This lowers piston (B), which forces filling into pastry shell.



general, and under the supervision of the Department of Agriculture and Markets, and concern themselves mainly with the cleanliness of the bake shop, and are not effective in preventing staphylococcus intoxication. One of the local bakers who requested the assistance of the Department of Health in protecting the baking industry from the economic loss following these outbreaks, reported that his business in eclairs and other cream-filled pastries and similar baked goods decreased markedly due to the reaction of the public to the outbreak.

The State Department of Health has no special regulations relative to the preparation of cream-filled pastries. The Westchester County Department of Health,<sup>7</sup> however, has incorporated in its Sanitary Code regulations relative to custard-filled pastries. Their code requires that the entire custard mix be heated to at least 200° F. for a period of 10 minutes, immediately cooled, placed in a refrigerating temperature not over 50° F. within an hour, and kept at or below that temperature until applied to the pastry. The City of Baltimore<sup>8</sup> for some time has been advising bakers to rebake cream-filled pastry. The American Institute of Baking has made efforts to educate the bakers of the country concerning the work of Stritar, Dack, and Jungewaelter<sup>9</sup> on the rebaking of custard-filled baked products. This work has been confirmed by Gilcreas and Coleman.<sup>10</sup>

It is believed that custard-filled pastry can be safely prepared if the following precautions are taken:

1. Exclusion from handling of materials of any person suffering from a skin infection or purulent lesion.
2. Heating of the custard and the custard mix to a temperature of not less than 200° for a period of 10 minutes.
3. Prompt cooling and filling of pastry shells within an hour of preparing the mix.
4. Prompt rebaking of the filled eclairs or cream puffs at 425° F. for 30 minutes.

5. Proper refrigeration between rebaking and consumption is an added precaution, but may be difficult to secure since it tends to decrease the attractiveness of the pastries, makes their display inconvenient, and is not essential.

#### SUMMARY

1. Outbreaks of food poisoning due to staphylococcus toxins in cream-filled pastries are not uncommon.
2. During the 5 year period 1935-1939 inclusive, 17 outbreaks of gastroenteritis involving 1,246 cases due to eating cream-filled pastries were investigated in New York State exclusive of New York City. Thirteen of these, resulting in 1,227 known cases, were apparently due to staphylococcus.
3. Five of the outbreaks, accounting for 60 cases, were traced to pastries from a single bakery.
4. Chocolate eclairs and cream puffs were most commonly involved, rarely cream-filled pies.
5. Contrary to general belief, the pastries are as liable to cause illness in the colder months of the year as in summer.
6. Prompt handling and rebaking are important factors in prevention.

#### REFERENCES

1. Eakins, Wallace T., and Blanchard, Cecil K. *Pub. Health News*, Department of Health, State of New Jersey, 19, 7:508, July-August, 1935.
2. Gilbert, Ruth, Coleman, Marion B., and Laviano, Alice B. Food Poisoning Due to Toxic Substances Formed by Strains of the Cloacae-aerogenes Group. *A.J.P.H.*, 22, 7:721 (July), 1932.
3. Staff, Edgar J., and Grover, Maurice L. An Outbreak of Salmonella Food Infection Caused by Filled Pastry Products. *Food Research*, 1, 5:465, (Sept.-Oct.), 1936.
4. Geiger, J. C. Two Outbreaks of Food Poisoning. *Pub. Health Rep.*, 52, 24:765 (June 11), 1937.
5. Roberts, James. A Third Outbreak of Staphylococcus Food Poisoning in Hamilton, Ontario. *Canad. Pub. Health J.*, 30, 590, 1939.
6. Jordan, E. O. *Food Poisoning and Food-Borne Infection*, University of Chicago Press, 1931.
7. Tanner, F. W. *Food-Borne Infections and Intoxications*, Twin City Printing Co., 1933.
8. Shrader, J. H. *Food Control*, Wiley, 1939.
9. Sanitary Code, Westchester County Department of Health, Article III, Sec. 5, 1938.
10. *Baltimore Health News*, XII, 5:130 (May), 1935.
11. *Ibid.*, XIII, 9:58 (Sept.), 1936.
12. *Ibid.*, XIII, 10:65 (Oct.), 1936.
13. Stritar, Joseph, Dack, O. M., and Jungewaelter, Frank G. Control of Staphylococcus in Puffs and Eclairs. *Food Research*, 1, 3:237 (May-June), 1936.
14. Gilcreas, T. W., and Coleman, M. B. (To Be Published.)

NOTE: Acknowledgment is made to the several District Health Officers in New York State whose reports of outbreaks on record in the State Department of Health files were reviewed.

# Vital Statistics and National Defense\*

STUART A. RICE, PH.D.

*Assistant Director, U. S. Bureau of the Budget, in Charge of the Division of Statistical Standards, Washington, D. C.*

AT what would now be called a "press conference," the late Charles Francis Murphy of Tammany Hall was once confronted by reporters with evidence that a reform wave was gathering momentum. "Well, boys," he said, "I'm for the 'uplift' too, if that's the word!" The word in the minds and on the lips of everyone is now "defense." It may be anticipated that many cats and dogs which have loitered upon doorsteps for unnoticed years will now seek to slip through doors, which the word has opened, by claiming their indispensability to the national effort.

In this paper I am going to run the risk of sponsoring for admission what some will regard as one of these cats and dogs. I am going to raise again, wholly as a matter of personal opinion and without very much argument, the long standing question of universal registration in the United States. I will contend that universal registration is a defense requirement. I shall also insist that my remarks receive the respect merited by scientific discussion. Your indulgence is therefore solicited for some preliminary remarks on the relations of science and scientists, including statisticians, to social interest. I believe that a consideration of this sub-

ject is essential to a balanced view of my major theme.

The judgments and behavior of human beings are subtly influenced, even when they are scientists, by the prevailing foci of social interest, as well as by the prevailing fashions of thought and interpretation. This truth caught up with me some years ago when I was a graduate student. I had been asked to undertake some statistical research for a well known organization. I found what I thought were relevant data in certain published rates of mortality from certain primary causes of death. I proposed to draw various conclusions respecting changes in social habits from changes in these mortality rates over a period of time. At this point Dr. Louis I. Dublin suggested to me that the time trends which I found in the rates might reflect nothing more than changes in the prevailing fashions of medical diagnosis. The revelation of such possibilities, with its immediately shattering effects upon my expectations of drawing significant conclusions, has darkened my whole subsequent outlook on data. I observe with gloom much which is painted in colors of sweetness and light; and I hold Dr. Dublin accountable.

I fancy, however, that I am speaking to fellow pessimists. Probably no group of persons is more conscious than the members of this audience of the fact that phenomenal observations are

---

\* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

characteristically distorted by human preconceptions. The statistician has the difficult task of seeking truth by combining the distorted reports of other observers. Happy indeed is he who can be sure that the individual errors of these observers are "compensating." How can errors offset each other when all observers are equally subject to the distorting effects of fashion and of current trends of opinion?

Even if fashion is without influence upon the character of observations or upon the conclusions drawn from data, the foci of public interest are likely to determine in the first instance the choice of the subject for investigation, and thus to affect the directions in which "knowledge" accumulates. In the long run, this form of selection may be as important in its biasing effects as are more deliberate and more demonstrable forms of manipulation. After seven years in the midst of federal statistical activities in Washington, I would be able to cite few if any instances of deliberate distortion or suppression of scientific research findings. But I believe that the projection or non-projection, the authorization or non-authorization of federal research activities, has sometimes had an equivalent result. I concur with David Lindsay Watson in his significant book *Scientists are Human* that "the passions and self-deceptions which scientific men share with the rest of mankind are supremely relevant to the real human worth of the 'scientific truth' that they create." This is one of the inescapable limitations within which we work.

One conclusion from these reflections is that statisticians usually have tasks which are as much sociological as they are logical and mathematical. Their technical skills must embrace a knowledge of what to count no less than how to count. To the layman the distinctions seem clear-cut as between truth and error, black and white, good and

bad, urban and rural, farm and non-farm, fatal and not-fatal, born and still-born. Broadly speaking, these delineations are based upon social conceptions which are indistinct and subject to variation in time and place. Competent judgments concerning each of them entail, or suggest the need of, sociological exploration.

Let me illustrate: Assume that it is desired to compare the birth rates and death rates of rural and urban populations, in relation to trends in the rural-urban distribution of population. The questions affected by the results of such comparisons are important and the problem is clean-cut. The conceptions expressed by the terms "urban" and "rural," however, are not clean-cut. What do they mean? Agreement could probably be reached upon instances of "urban" and of "rural" right here in Wayne County, Mich. But upon the essential character of the distinction agreement would be doubtful. The terms must have something to do with varying ways of life, since each of us recognizes the urbanity of friends who live in the country, and the survival of rural traits among Appalachian highlanders who migrate to industrial centers. Even the occupational classifications of individuals, or the presence or absence of certain utilities which are adjuncts to living, provide no certain criteria. The U. S. Bureau of the Census is compelled to rely upon such unrefined and arbitrary criteria as municipal incorporation or non-incorporation (except in New England and in certain other localities), the population size of incorporated places (regardless of social structure), and gross population density within the haphazard boundaries of minor civil divisions.

What does all this have to do with vital statistics, with national defense, and with my previously announced intention to advocate universal registration? It is intended to illustrate the

inability of science to free itself wholly from its social milieu, to record its dependence upon sociologically defined conceptions, and to suggest the advisability of occasional reexaminations of its socially derived conceptual premises, especially in periods of revolutionary social change. We are now in such a period. The theme of national defense, in its present context, certifies to the revolutionary character of our period. If, as I believe, the lives and living habits of our people are to be rapidly and radically altered in the future, should we not review the standpoints from which the statistics of life are collected and compiled? Perhaps universal registration, if instituted, would not be regarded as an extension of the present tasks of vital statistics. It would nevertheless be closely related to your present work, and it would be based upon changing conceptions of the need for information about the lives of human beings.

Vital statistics, the statistics of life, have traditionally been concerned with those important terminal points of individual human existence, birth (including stillbirth) and death. This seems appropriate in an individualistic society in which everything that happens between these terminal events is very largely the individual's own affair, or that of his parents or guardians. Sometimes the conception of the field is extended to include those exceptionally consequential way-points of individual lives, marriage and divorce. But the world of individualism—like it or not—is on the defensive. Free people must defend or prepare to defend their possibilities of individuality; their rights to strive for the attainment of their highest potential development as human, intellectual, and spiritual entities.

Words are the signposts by means of which we recognize our intellectual and moral surroundings. Many of us are

bewildered in a world in which some words have suddenly lost their familiar meanings. An intimate friend of mine insists on knowing, when we talk of defense, what it is we are going to defend. A military answer can be made in precise terms: In certain contingencies we can and must defend such and such utilities, military strongholds, territorial areas and waters. But the more important answer is that we must defend our way of life in a world all major divisions of which but our own have abandoned or are threatened with the loss of that way of life. Nonsense, says my friend; we can wait to talk about defending our way of life until we are threatened with war upon us, and that does not appear in prospect, unless we ourselves precipitate it. To which I reply, war is already being waged upon us; you have failed to note that the meaning of the word has changed. War and defensive needs have both become total. Military preparations apply only to the central segments of our defensive lines. Industry, science, administration, morale, the national mentality, and the national health and vitality are related and supporting segments of the front.

All but a negligible number of Americans hope that action will not be required on the military segments of our defensive front. Indeed, there is much competent opinion that our own military action at this time would detract from our all-important aid to Great Britain, and hence be ill-timed with respect to the grand strategy of American defensive policy. Action on the supporting flanks, however, is immensely important. And as long as the task of total defense confronts us, all segments of the front and the individuals thereon, with single-mindedness of purpose, must contribute to and be subordinated to, defense requirements. For the time being the individual is important only to the extent that by

serving the interests of our free nation he helps to preserve the possibility of individuality in the world to come. The vitality of the nation, conceived as a collectivity distinct from the individuals who compose it, has become supremely important.

Births and deaths, as well as marriages and divorces, from this standpoint, are important data in the assemblage of information concerning the vitality of the nation. But they portray only a part of the total picture which has come to be of national importance. The nation must know what happens to its citizens between their terminal points. We obtain such intermediate information in a spotted, fragmentary, and cross-sectional manner, by periodic censuses, by school records, by surveys, by tax returns, by special reports upon certain types of social or antisocial activities or economic transactions. We do not obtain consistent, longitudinal information, which regards each person as a persisting, identifiable entity within the nation.

Through its agencies of government and its governmentally regulated utilities, society has recorded my birth, my marriage, my parenthood, my ownership of an automobile, my right to operate it, my eligibility to vote, my income, my possession of real property, my equitable contributions to the costs of government, my use of a telephone, my consumption of gas and electricity, my right to travel outside our national boundaries, and many other personal items about me, in addition to those which I have divulged in the decennial census. Thus, it occasionally records my communicable diseases. It will ultimately record my death. Is it not reasonable to bring some of these records into statistical juxtaposition? To regard more than the first and the last of them as data of my life? To regard my life as a dynamic, continuing existence, which functions and is punc-

tuated by events; and not as something which comes into existence, and is then lost sight of, save at ten year and other irregular intervals, until the single, final act by means of which it disappears?

I am urging that some group of statisticians, perhaps those of this audience, come to regard lives as continuing, dynamic, functioning, whole entities; to be statistically summated in their processes of functioning and not only at their beginnings and endings. The first step toward the statistical implementation of such a viewpoint would seem to be the establishment of a system of universal registration and identification, starting with birth and serving through life as a master record, to which innumerable partial registers could be related.

I shall not attempt further in this paper to indicate the character of such a system. Its establishment has long been regarded by many thoughtful students as desirable, but as so inconsistent with American traditions as to be impossible of attainment. I believe this supposition to be directly opposite to the actualities. We now have what amounts to compulsory registration of everybody, but in a fragmentary manner, and for diverse purposes. Our innumerable registers have never been combined into a master register. More than 50 million workers have registered for benefits under the Old Age and Survivors Insurance system of the federal government; 47 million new applicants for work (including a substantial number of duplications) have been registered with the United States Employment Service since July 1, 1933; a much smaller but nevertheless large number have registered for relief and work relief; 11 million registered in the 1937 census of unemployment; although no accurate summary figures are available, it is probable that 45 million persons have registered for drivers'

permits; perhaps 60 million have registered as voters in elections; in a few days 16 million young men will register for selective service, and several millions are now answering the questions prescribed under the Alien Registration Act.

We pride ourselves on the universality of our public school system, under which very few native born Americans have not in their youth been registered under compulsion by agents of the State; and the birth and death registration areas, we proudly assert, are now "complete."

Why not try to achieve consistency and order among these numerous and omnipresent partial registration systems

by establishing a single "master" register, from which each person may be able to establish his existence and his identity? The creation of the register would be a scientific and administrative task, sociologically motivated, of very large magnitude. Its difficulty is probably the real reason why it has not been undertaken hitherto. But the nation has undertaken successfully other difficult tasks when convinced of their importance. Universal registration would indeed make possible the compilation of new kinds of vital statistics, suitable to the needs of universal, selective service in the cause of a total defense of our national liberties.

## DISCUSSION

LOUIS I. DUBLIN, PH.D., F.A.P.H.A.

*Metropolitan Life Insurance Company, New York, N. Y.*

WE are indebted to Dr. Rice for a very suggestive and useful contribution. I believe that a system of universal registration in the United States will ultimately be developed and that such a system will prove exceedingly valuable, not only in providing for national defense but in putting at our disposal a gold mine of information concerning the life of our people.

As Dr. Rice has pointed out, much of the data which would be collected by the central registry is now collected in scattered repositories but remains, for the most part, unused. It would take really little additional effort to bring all of these threads on the individual together at one place. Here, modern methods of filing and of indexing, of tabulation and of analysis, should revolutionize our knowledge of the effects of our various social institutions. Think how valuable such a repository would prove now to our various defense committees in their search for the variety

of skills which are needed in our defense program. And in normal peace times, what an opportunity would be at the disposal of the lucky statisticians and sociologists who would be connected with such an organization.

There will be considerable resistance to the establishment of a universal system of registration. The necessary legislation will be difficult to obtain. It will be objected that a central system of registration will add enormously to the knowledge and, therefore, to the power of the federal government. Cries of regimentation will undoubtedly be heard.

The system will also involve a very sizable expenditure. In a population of 130-odd million, one record a year per individual might involve an annual budget running in the direction of a hundred million dollars. Dr. Rice as the Assistant Director of the Bureau of the Budget will know better than any one else how difficult it would be to

justify such an appropriation under current conditions. On the other hand, one could point to many valuable services which such universal registration would render. There would be compensating savings in the cost of the decennial census. It would be unnecessary in most cases to collect new data, and there should be a sizable saving in research conducted here and there by the various departments of

government. This registry office would be a research agency par excellence.

It will take a long time before such a system as Dr. Rice has outlined could be established, and it would be well in the meanwhile to explore the possibilities, legal, financial, and administrative. I would recommend that a committee of the Section be appointed to study the problem and report back to the Association from time to time.

## Exhibits\*

MAYHEW DERRYBERRY, PH.D., F.A.P.H.A.

*Senior Social Science Analyst, U. S. Public Health Service, Bethesda, Md.*

HEALTH educators have recently become increasingly concerned about the effectiveness of their efforts. No longer satisfied with their own subjective judgments of their work, they have begun to ask: Is this poster attractive to other people? Is this pamphlet interesting? Will this exhibit teach what we think it does? Does the public really examine our material, and do our messages get across?

It is difficult to get reliable answers to such critical questions about methods of health education. A given poster, exhibit, motion picture, or pamphlet might be considered excellent by one leader and be labeled poor by another equally competent. Disagreements in judgment are, in fact, as common as agreements. Recognizing, therefore, that subjective evaluation, even by experts, fails to furnish an index of effectiveness, Homer Calver, of the American Museum of Health, suggested a comprehensive study of the exhibits assembled by the Museum in the Medicine and Public Health Building at the New York World's Fair. Firmly convinced of the need for more objective evaluation, the Museum and the Public Health Service undertook the study, from which a few of the practical conclusions may be given.

In this evaluative study, the analysis has been focused on the public's reaction to the exhibits, rather than on the characteristics of the exhibits themselves. Thus, in order to measure the effectiveness of the exhibits, data were collected to answer such questions as:

1. Does this exhibit attract attention?
2. Does it sustain interest?
3. Can it be easily understood?
4. Does the audience get the message?

In order to answer the first two questions, the behavior of a random sampling of 3,000 visitors to the building was observed. In each instance, a member of the staff followed an individual through the building and recorded each exhibit at which the visitor stopped, together with the length of time (by stop watch) he remained there. The summarized record indicates the relative popularity of the display and how well it retains the interest of those whose attention it attracted.

Answering the question, "Could it be easily understood?" required the collection of several types of data.

a. How long did it take to read the legend? This factor, together with the average length of time individuals actually looked at the exhibit, gives presumptive evidence of the extent to which it was possible for the total message to be obtained.

b. Were the words used too technical for the public to understand? The relative difficulty of each word in the legends was checked against the frequency with which it was in common use, as shown by the Thorndike

---

\* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 10, 1940.



Word List of the 20,000 most commonly used words.

c. Was the exhibitor's objective readily apparent to the spectator? A number of individuals were asked what they thought the exhibit was expected to teach, and their opinions were checked against the objective stated by the committee responsible for the exhibit.

Test questions based on the content of the several exhibits were used to measure whether the public learned the message. At a booth called the "Quiz Corner," individuals were tested and the tests were marked according to whether a given exhibit had or had not been seen. By comparing scores obtained before viewing an exhibit and those obtained after viewing it, one index of the effectiveness of the exhibit is secured.

Such then, are a few of the types of data obtained, and the present discussion will be limited to the items

listed above. The complete scope of the data will be discussed in the final report, but the examples given here are believed to be sufficient to indicate the method of attack on the problem.

What practical conclusions can be drawn as a result of this study? Even though tabulations are still incomplete, several well defined principles of exhibit construction are apparent from the preliminary analysis. Each such principle or indication of proper technic will be listed and discussed below.

*Panels of Statistical Data, Graphs and Tables Fail Signally in Attracting or Retaining Attention*—The Pneumonia Exhibit in the Hall of Man was displayed on two walls set at right angles to each other (Figure 1). The right-hand wall presented statistical material, whereas the left-hand wall was made up of panels describing the disease and its course. Adjoining the statistical panel

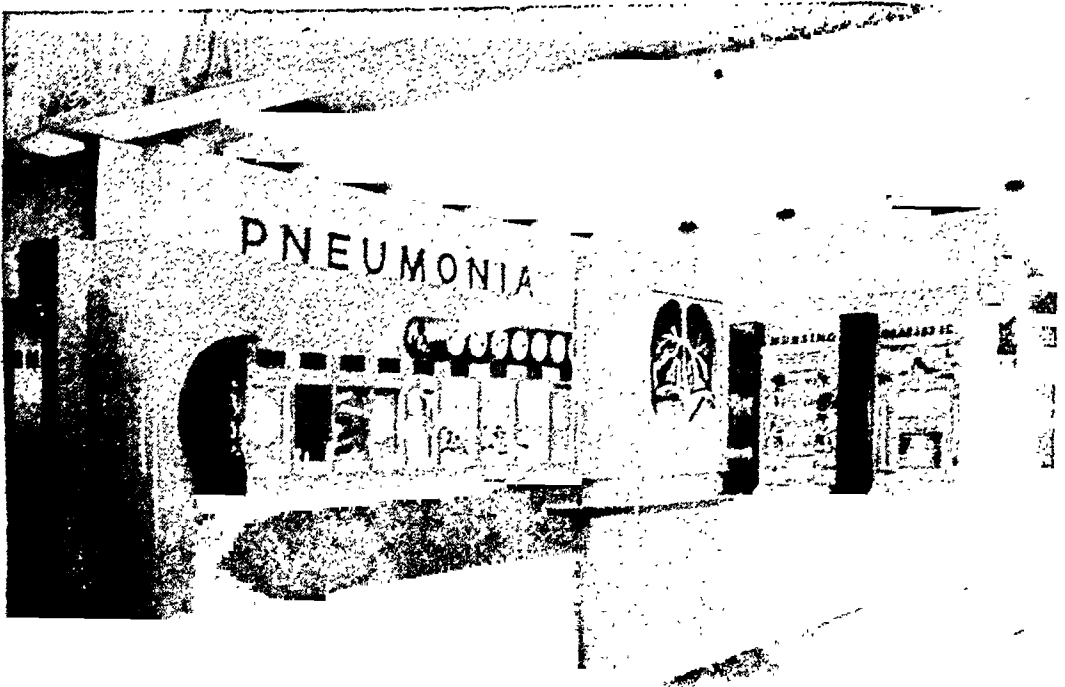


FIGURE 1.—Pneumonia Exhibit—Statistical panel on extreme right

was one having to do with proper nursing. Out of 950,000 persons who viewed any part of the Pneumonia Exhibit, 9 out of 10 (88 per cent) spent some time examining the panel describing the disease, whereas only 2 out of 10 (18 per cent) spent any measurable amount of time examining the statistical panel. Even the nursing panel, which might have been considered disadvantageously placed since it was nearest the corner, attracted and held the attention of 3 out of each 10 persons who visited the exhibit. The conclusion here is quite obvious; namely, that any message that might have been conveyed by the statistical panel was totally missed by four-fifths of its possible audience.

The Maze of Superstitions also included a statistical panel and similar observations were taken in that exhibit. Among all those who visited the exhibit, the proportion attracted to the statistical panel was much less than half of the number that visited any other part of the exhibit. One-fourth of all who saw the exhibit looked at every part of it except the statistical panel. In this connection it should be noted that the criterion of "looking at" or "viewing" was the ability of an observer to detect the individual being observed in the act of looking at the exhibit for a period of time measurable on a stop watch.

The Demography Exhibit, portraying various phases of population growth and distribution in the United States, although it occupied a prominent position in the Hall of Man, attracted fewer spectators than any other exhibit of comparable size in that part of the building.

The time required to read the legends in statistical panels was longer than for any other part of the exhibit. Nevertheless, persons who visited or looked at the statistical panels spent less time in such viewing than in looking at any other panel. It is apparent, therefore,

that the statistical panels not only failed to attract the attention of a large proportion of the visitors, but they also failed to hold interest in those whom they did attract.

*Statistical Panels Frequently Fail to Convey a Message*—In order to test how much spectators learned, a series of questions based on the statistical exhibits were presented to visitors. The answers were segregated according to whether or not the individual taking the test had seen the exhibit in question. When the following true-false and multiple-choice tests based on the Pneumonia and Demography Exhibit were used, no significant difference could be detected between the answers of those who had seen the exhibits and of those who had not. In some cases the proportion answering the questions correctly is slightly higher among those who had seen the exhibits, but the result could not be called statistically significant. The questions used are as follows:

More people die from pneumonia than from cancer. True False

The pneumonia death rate is higher in middle age than in infancy. True False

Among the causes of death, pneumonia ranks: first, third, fifth, tenth.

The number of deaths caused by pneumonia each year in the United States is approximately: 20,000, 130,000, 250,000, 460,000.

One-eighth of the world's population now live in America. True False

The greatest number of foreign born persons in the United States in 1930 came from: Germany, Italy, Russia, Ireland.

The conclusion stated just above relates to panels in which a number of facts are presented. In contrast to that conclusion, it appears, therefore, that if a single statistical fact is the major emphasis of an exhibit, it is much more likely to be learned. For example, two such facts in one of the exhibits appear in the pictures of Figure 2. When the following questions were used to test the educational effectiveness of such isolated statistical facts, the proportion

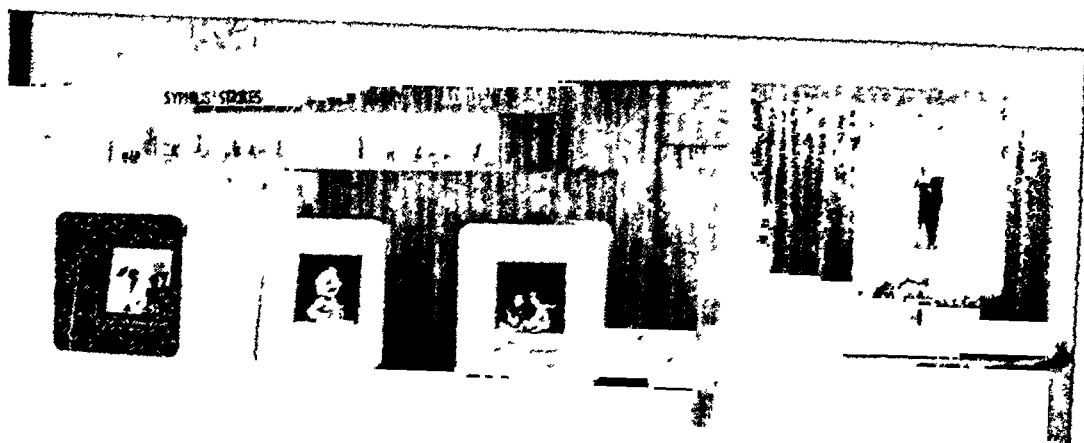


FIGURE 2—Syphilis Exhibit panel

answering correctly was significantly greater among those who had seen the exhibits than among those who had not.

The percentage of the adult population stricken by syphilis is estimated to be: 1%, 3%, 5%, 10%

The largest number of cases of syphilis reported as traced to one infected person is: 2, 24, 56, 106

This small sampling would suggest the importance of limiting statistical material to one or two outstanding facts which are given prominence. This point is being emphasized because many health exhibits consist almost wholly of statistical material, and especially since it seems possible that those whose major interest is in statistics may have overestimated the public's concern for that type of information.

*The Message to Be Conveyed Must Be the Focus of Attention*—The exhibit called "The First Year of Life" (Figure 3), through its arrangement focused attention on a number of models illustrating the physiology of pregnancy. The sponsors of the exhibit, however, stated as their objective the education of the spectators in the hygiene of pregnancy. Material on the latter subject was arranged in front of and below the models and thus was not the normal focus of attention. In testing the effectiveness of the exhibit, the questions used were limited to the subject of

hygiene. The result was that, for each question, the number of correct responses was approximately the same, regardless of whether the exhibit had or had not been seen. Furthermore, this was the only exhibit tested on which we failed to obtain for at least some of the questions statistically reliable differences between those who saw and those who did not see the exhibit. Upon learning of these findings, the association sponsoring the exhibit decided to study the problem during the 1940 Fair. The conclusion stated above is substantiated by the fact that, for questions based on the material in the models, significant differences are obtained in the responses of those who have seen the exhibit as opposed to those who have not.

*The Use of Even Common Professional Words May Be Misleading to the Public*—Our study of the vocabulary used in legends indicates that even the most common professional words may be incomprehensible or unknown to the group intended to be reached. By selecting 50 words of varying difficulty from the legends of exhibits and asking classes of college students and a group of WPA clerical workers to define the terms, an unexpectedly high proportion of the terms were found to be completely misunderstood. For example, one-half of those responding had no idea

of the meaning of "nephritis" and an additional one-fourth had incorrect ideas about the term. It was thought by some to mean nervous disorder; by others, rheumatism; and by still others, blood disease. Similar results were found when the test words were "strabismus," "placenta," and "therapeutic." Public health workers, to whom these are everyday terms, may well beware of their use in exhibits designed for the general public.

*Even Expertly Designed Exhibits May Impart Misinformation*—In one exhibit there were a number of pictures of contrasts in the appearance of healthy and abnormal conditions in children. With one exception, the pictures showed white children. In the illustration having to do with rickets, however, the two contrasting pictures were both of Negro children. When the statement "Rickets is primarily a disease of Negro children" was scored by those who saw

the exhibit, it was regarded as true almost twice as frequently as by those who had not seen the exhibit. The variation of more than one factor in a series of contrasts in this instance left a completely wrong impression.

Similarly, in the exhibit on Anemia, inadequate labeling was responsible for misinformation. In this instance, the misinformation was due to individual misinterpretations of unlabeled color transparencies. One particular color transparency pictures the foods that are rich in iron. However, since the individual foods were not labeled in the picture, persons tended to draw their own conclusions as to what specific foods were meant. Of the number of persons asked to name the foods in the exhibits, universal agreement was obtained for only three items. One particular picture, for example, was variously considered to represent apricots, new potatoes, plums, tomatoes,



FIGURE 3—First Year of Life Exhibit (Note the material in the trough below the shelf on which the models are shown)

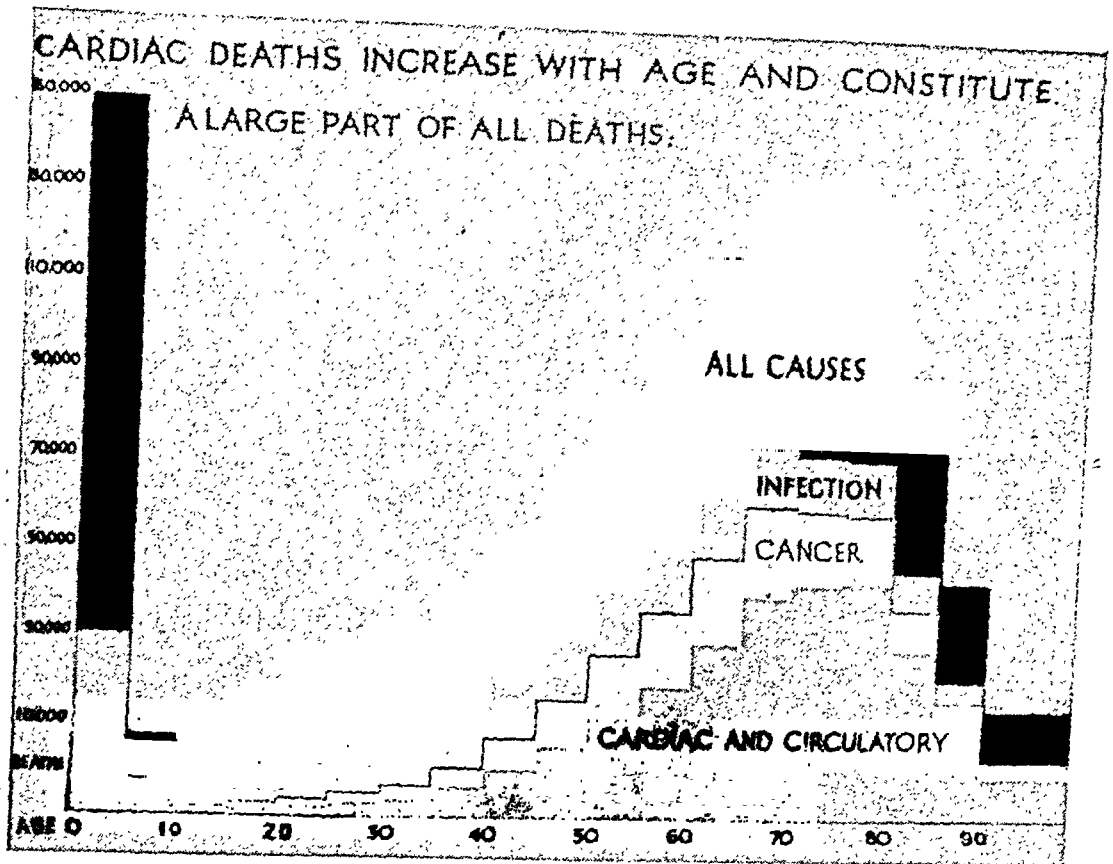


FIGURE 4—Heart and Blood Circulation Exhibit panel

and peaches. Another was thought to represent prunes, mushrooms, kidneys, or chicken livers. Incidentally, a similar situation has been observed in the Diabetes Exhibit in the San Francisco Fair. In this instance, the foods pictured as proper for a diabetic were not labeled, so that a number of spectators, being asked what meat was pictured, gave various answers, such as ham, pork, lamb chops, and steak.

Fifty-four individuals were asked which of the three groups of diseases shown in Figure 4, cardiac, cancer, and infection, causes the most deaths. All but four replied "infection." Although the chart is accurately drawn and does not indicate that infection causes more deaths than cardiac disease, it gives that impression to the casual spectator, and it is these wrong impressions that are learned rather than the truth.

*Tests as an Educational Technic—*  
In the course of our study, we more

or less accidentally discovered what seems to be a valuable health education technic. It was carried out with 35,000 visitors at the 1939 New York Fair and has been repeated with double that number at the San Francisco Fair in 1940. Seven tests on health information were used to determine what the public knows about health. Visitors gladly took the tests but also demanded to know the correct answers. Accordingly, brief answers to all questions were prepared and each such answer gave not only the correct response but some explanation of the reason for it. Originally sent out to those who had requested them, the answers were later given to the visitors immediately after taking the tests. We have found that practically all who took the tests read the answers.

Additional interest in the technic is indicated by the volume of requests for additional copies for unions, schools,

Civilian Conservation Camps, and individuals who desire the tests to give to their friends. Although we have no direct evaluation of the effectiveness of the device in teaching health to the public, it does meet our first two criteria of attracting attention and sustaining interest, at least until the material is read.

A practical adaptation of the technic has been worked out for use in community groups by a few health educators. Questions based on the material which is to be taught are given to members of group meetings at the beginning of the meeting. During the meeting the

major portion of the time is given over to discussion of the answers. This method has been found to arouse active interest in the material to be taught.

While it has been impossible in a brief paper to describe the many interesting and outstanding exhibits, an attempt has been made to caution against the hazards of presentation, as well as to indicate the need for experimental study of our educational efforts. In this attempt, emphasis has naturally been given to some of the minor limitations in exhibits so that the need for care in selecting material and organizing it may be stressed.

# American Journal of Public Health

## and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

March, 1941

Number 3

H. S. MUSTARD, M.D., *Editor*  
MAZŮCK P. RAVENEL, M.D., *Editor Emeritus*

LEONA BAUMGARTNER, M.D., *Associate Editor*  
ARTHUR P. MILLER, C.E., *Associate Editor*

AUGUSTA JAY, *Editorial Associate*

### *Editorial Board*

REGINALD M. ATWATER, M.D.  
*Chairman, and Managing Editor*  
IRA V. HISCOCK, Sc.D.  
KENNETH F. MAXCY, M.D.  
HENRY E. MELENEY, M.D.

## CHARLES VALUE CHAPIN

1856-1941

ON January the thirty-first the life of this wise and good man came to an end. In his later years he lived quietly, and quietly he died. But, though he enjoyed his well earned retirement, such an unruffled life was in marked contrast to the years that had gone before. Seldom in public health work has there been a more active career; even less often has there been one as productive.

The record of Dr. Chapin's work, of his accomplishments, and of the honors conferred upon him constitutes a treasured page in public health history. Of particular interest to readers of the *Journal* is that he was President of the American Public Health Association in 1927, and the first recipient of the Sedgwick Medal, which was awarded him in 1929. Even more significant and more inspiring than a cataloging of events of this sort, however, is the example which he has set for others, particularly to public health administrators and epidemiologists. Entering these fields when the basis for action was tradition, when environmental hygiene held sway, and, in the spread of disease, fomites loomed larger than persons; and when it was the custom for health officers to buttress assumptions with ex-cathedra pronouncements, Dr. Chapin, had he not possessed a keen and inquiring mind and a serene courage, might have lived and died unnoticed as did most of his contemporaries. But he had such a mind, and was possessed of such a courage. Never a rebel, he nonetheless dared to test the validity of vested opinions in public health practice, and if he found them wrong he presented, in beautiful simplicity, the facts from which he had drawn his conclusions. Then, he corrected his own practice, and in due time other persons followed, so that today, particularly in the investigation and control of communicable diseases, applied epidemiology owes to him much of the exactness and productiveness of its procedures.

Many will best remember Dr. Chapin for his *Sources and Modes of Infection*. This volume has become a public health classic and deservedly so. Some will associate him with his published studies in sanitation, which early set a pattern for an analytical approach to public health administration. What most do not

know is that Dr. Chapin's annual reports of the health department of the City of Providence are documents of unique value. These reports show the mind of Chapin at work: scrupulous care in collection of information, painstaking tabulations and segregations of data, penetrating questions as to their meaning or lack of meaning, with conclusions reached only when it is evident that they must inevitably be reached. His utilization and interpretation of what most health officers consider uninspiring routine cumulative data is comparable in importance with Farr's analyses of the Registrar Generals' material. These reports we commend to all students of public health.

And so, though we have lost a great man, his influence will carry on. In memory he will be held as one in that great company which includes Sydenham, Hunter, Snow, Budd, Biggs, and Frost.

## NATIONAL DEFENSE AND THE PUBLIC HEALTH

IN all-out preparedness there is general agreement that the armed forces are but the spearhead of a national defense; that the industry of the nation so preparing must be shaped and geared to provide the planes and tanks and guns and ships which the fighting services must have. A similar realistic approach is evidenced in the selective service act, in which it is recognized that while one man may best serve the national needs by handling a machine gun, another must be put to the making of that gun, a third to getting out the raw materials that go into it, and a number of others are essential for feeding and clothing the gunners and gun makers.

In spite of headlined charges about "bottlenecks," defense efforts and coördinations appear to be proceeding with an amazing speed and efficiency. Some overlapping, and gaps and errors of commission and omission are, of course, inevitable; and competitions between dramatic military demands and seemingly humdrum civilian necessities will continue to arise. The members of this Association are, naturally, seriously concerned with these matters as they relate to the public health. The basis of the problem is quite simple: though in the preparedness program the necessity for healthy troops and civilian population is recognized in the abstract, there has not been effective acceptance of the fact that the whole structure of defense depends upon the workers' ability to go to work tomorrow, and upon the soldiers' readiness to fall-in at command. Conversationally, national, state, and local authorities will concede the importance of health and would be amazed and indignant if an epidemic interrupted work in an industrial area or made ineffective a high proportion of troops in this training base or that. But the point is, not enough has been done to prevent such outbreaks. Consider, for example, the problem of malaria. In many instances, because of climate, camps have been placed in areas where that disease is endemic, where the *Anopheles* prevails. The infected mosquito does not recognize a government reservation, and, be the sanitary conditions of the camp itself ever so commendable, reasonably complete protection can come only if a civilian-occupied zone surrounding the military area is placed under proper sanitary supervision. This costs money, more perhaps than the local health department has in its entire budget, and malaria remains as a menace. Similar problems arise in other connections: venereal diseases, typhoid fever, dysentery, industrial diseases, etc. The Executive Board of this Association, meeting recently with its Committee on National



Defense, felt this situation to be sufficiently serious to justify release of the following statement to the press: "The Board and the Committee . . . view with increasing misgiving the fact that a complete no-man's-land is being created around new military and industrial areas which are not receiving adequate federal, state, or local health protection. This condition constitutes a major health hazard. . . ."

The board and committee, at the same meeting, touched upon another matter, thus: "Indiscriminate drafting of trained public health workers into military operations leaves the civilian population of the country inadequately provided with the public health protection and service which it must have." While the individual public health worker may be able to do little about obtaining funds for vast public health undertakings, the question of staying with or leaving a responsible position in health work is to some extent a matter of personal decision. Naturally, the glamor of strange places, of adventure and change beckon to the young and robust; the possibility of escape from what has become the dull routine of civilian life will appeal to the elders; and the satisfaction, not only of doing one's patriotic duty, but of getting public recognition of having done this in time of need, will strongly influence each person's decision. It is to be hoped, however, that the health officer, nurse, sanitarian, and others similarly employed will realize that the vast and complicated necessities of the present emergency cannot be met by impulse nor by the independent, uncoordinated and, to some extent, conflicting decisions of millions of different individuals. With this in mind, and until the whole problem of defense is in better perspective, the most truly patriotic act for each health worker would appear to be to continue to serve in that element of national defense for which he or she has been intensively trained: the maintenance of services for the direct protection of the health of the civilian population, thus rendering an important even if indirect aid to the whole needs of his or her country.

## THE MERIT SYSTEM AND PUBLIC HEALTH WORK

NEARLY a third of a century of government under the Constitution seems to have passed before Congressmen and Senators and their respective administrations and parties became reasonably adept in using patronage as a means of furthering political survival. But having acquired expertness in this direction, they were not long in putting it to use, and with changes in party dominance, civilian employees of each previous federal administration were labelled as rascals, quite properly to be put out of office. Recognizing that not all the electorate would approve such a flagrant method of settling old scores and distributing benefits, national politicians coined two new expressions to justify this summary action, and, as is done today, attempted to pound them into the public consciousness. The first of these expressions carried the idea that to the victor belongs the spoils: the second, that any citizen in a democratic government is competent to discharge the duties of any office under that government.

If one may believe the records of the period of 1825-1880, the federal civil servant of that time was not an efficient person, nor did competence, if exhibited, have any bearing upon tenure of office. Appointees floated in on the flood of a particular political tide and incumbents drifted out with its ebb. In the meantime, the affairs of government suffered correspondingly and sometimes dramatically. Matters finally reached such a point that in 1883 there was enacted a civil

service law, designed to put an end to governmental incompetence and the existing abuses of patronage.

Now, because the establishment of a merit system is required for personnel serving in state health work contributed to from Social Security Funds, Titles V and VI, the extension of civil service benefits to health workers so employed and to health work so done is in the process of becoming a reality. This is greatly to be desired, and the Association has evidenced its interest in the matter by commissioning a subcommittee of the Committee on Professional Education to consider this problem in conference with a committee of the State and Territorial Health Officers.

The previous fine work of the Committee on Professional Education gives guarantee that this new assignment of theirs will be carried out more than creditably, and we hope that every reader of the *Journal* will give them the fullest measure of assistance in their endeavor to get facts and shape conclusions. Though the subcommittee, *per se*, will not carry any authority as to the kind of merit systems adopted in the several states, their influence will be exceedingly important, and because, in common with all human institutions, a professional staff built under ordinary civil service regulations has its liabilities as well as its assets, we urge that those administrators who have had experiences under civil service procedures give advice as to features that should be corrected as well as to basic necessities. Only in this way can there be developed a merit system fair to the worker and to the work to be done. For our own part, while recognizing the difficulty of evaluating the item of personality in an applicant, and while further recognizing that there is an opportunity for abuse when too much emphasis is placed on a quality so intangible as this, nevertheless we feel that there should be provision for a careful assay of both its positive and negative aspects in certification of eligibles. Again, the problem of age at retirement would seem to demand serious consideration: it is unfair both to the work and to the worker to expect an individual of sixty to continue to serve competently in certain aspects of field work, walking across fields in the country and climbing stairs in the city, day in and day out. Finally, we think it might be well to approach this whole problem of a merit system with a determination to give just as much protection to the work to be done as is given to the person who is to do the work.

In spite of recognized defects, not all of which can be prevented or removed, a merit system should do much in attracting competent persons to enter public health work. Properly organized and administered it will offer reasonable compensation and promotion, permanent tenure of office if competent, retirement provisions, and an opportunity to pursue an interesting and worth while career.

### DR. STILES, DR. VINCENT, DR. ROSE

NEWS comes of the death of three distinguished scientists, each illustrious in a separate field of public health. Charles Wardell Stiles died on January 24 at the age of 73; George E. Vincent died February 1 at the age of 76; and Mary Swartz Rose died February 2 at the age of 66.

Dr. Rose's contribution to public health was in the field of nutrition, she having served with distinction for some thirty-five years as a member of the faculty of Teachers College, Columbia University. She was particularly interested in furthering the practical application of nutritional facts to everyday life. Of her numerous

publications, perhaps *Feeding the Family* is best known. This book had and still has a wide appeal to nutritionists who are faced with the serious problem of guiding others to make every dollar count in the food budget, and every food count in nutritional needs. Not only did Dr. Rose contribute to public health directly, but by sending out class after class of inspired students she made life better for countless thousands.

Dr. George Vincent brought his unusual abilities to bear on public health after a long record of accomplishment in the field of education. From 1917 to 1929 he was president of the Rockefeller Foundation and in this capacity had opportunities to exercise his diverse talents in the solution of health problems arising in the first world war. Thus he fostered research, teaching, and the application of new methods in military medicine. Public health perhaps has never had a more persuasive platform advocate than was Dr. Vincent, for he was gifted as a speaker. All who have heard him will remember the rapidity of his speech, the clearness of diction, the orderly presentation of subject matter, and the underlying subtle wit which he inevitably manifested. He possessed that rare gift of obtaining approbation from a not friendly audience even though he presented them with unwelcome truths. Though theoretically retired since 1929, Dr. Vincent lived an active and useful life in the last decade. He gave much of his time to Community Chests and Councils, to participation in committee work, and to lectures. Public health loses an inspiring leader in the death of Dr. Vincent.

Charles Wardell Stiles is better known to the older group of health workers than to the younger, for he had lived in retirement for the past few years. In the early part of the century he was a familiar figure and his was a recognized voice in the medical schools and the medical societies of this country and abroad. His demonstration of hookworm as a frequent cause of the anemia and chronic illness of southern rural folk came in 1902 as a dramatic shock to the physicians of that time. Directly and indirectly, much of the development of rural health work today rests upon his research and his wholehearted evangelism for hookworm control.

Dr. Stiles was primarily a zoölogist, having served in the Bureau of Animal Industry of the U. S. Department of Agriculture, and as Professor of Zoölogy in the U. S. Public Health Service. He was a professor in Georgetown University, and in great demand as a lecturer in other medical schools. He represented this country in many international congresses in his special field, and contributed extensively to zoölogical nomenclature. Though his activities and interests precipitated him into many arguments, he seemed always to enjoy them, and he led a full and exciting life, devoted to science. Because of his contributions in helminthology and rural sanitation his name will be inscribed in public health history as one who benefitted mankind by his life and work.

## Credit Lines

### A Selective Digest of Diversified Health Interests

D. B. ARMSTRONG, M.D., AND JOHN LENTZ, M.S.

#### POSTERS FOR A PITTANCE

Posters are too expensive to produce . . . we need posters, but we can't afford to buy them . . . we want up-to-the-minute posters on a variety of health subjects, but our budget limits us to the home-made type. . . .

So run the familiar comments which all boil down to this: everybody wants posters, but nobody seems able to pay for them. It is true that artistically satisfying posters are costly when produced in small quantities. So, for most of us, posters are a perennial problem.

*Hygeia*, the American Medical Association's health magazine, can help to solve the poster problem for any perplexed health educator. The editors of that magazine have devised a series of posters utilizing the excellent photographic illustrations that have appeared on the covers of past issues of *Hygeia*. The cover photographs have been printed on durable paper sheets measuring 11 inches by 14 inches. Arresting captions and brief, though pointed, text accompany the illustrations. The necessary color element is found in the lettering or in the form of decorative "color blocks." These posters are attractive and meet the required elements of timeliness, usefulness, and accuracy. But, most important of all, they are cheap. Three sets of 8 posters each are available—all for the cost of only 25 cents per set, postpaid. A great many of the important subjects that health educators wish to publicize are included in this series of posters.

If you have not used any of *Hygeia's* health posters, we recommend them. They are the best answer we know to the question: Where can good, inexpensive health posters be secured?

#### PROCEEDINGS OF THE SEVENTH INSTITUTE ON PUBLIC HEALTH EDUCATION

"Health Education from A to Z" might be a good title for the bound volume that has been issued covering the transactions of the last Health Education Institute. Between the covers of this volume there is a plethora of information on practically all phases of our work. Since every page of this printed resumé of the Institute contains facts of interest and importance, it hardly seems fair to single out any features for special comment. Nevertheless, we wish to call attention to certain items such as the address of Dr. S. A. Courtis entitled "How to Lead Discussion Groups." This paper is worthy of study on the part of all health workers. The various bibliographies and lists of references included in this volume should be most useful to those who wish to do further reading on the subjects discussed. Then, there is a summary of Dr. Bruno Gebhard's exhibit tours which also contains many pointed observations that can be relied upon for guidance when one is confronted with exhibit construction. Finally, Miss Alma Haupt's discussion on "The Technique of the Personal Interview" should not be missed.

Copies of the transactions of the last Institute were mailed to all who attended the Detroit Meeting. We suggest that those who possess copies pass them on to others, for the written record of the 1940 Institute bristles with facts that can be used to advantage by all health department staffs.

#### THE N.T.A. EARLY DIAGNOSIS CAMPAIGN

"A good X-ray is your doctor's best aid in discovering *early* tuberculosis." This is the slogan of the Early Diagnosis Campaign to be undertaken by the National Tuberculosis Association in April—the 14th annual, non-fund-raising, nation-wide effort toward mass education regarding the early detection and proper care of tuberculosis. This campaign reflects one of the earliest concepts in tuberculosis epidemiology, phrased at the time of the Framingham tuberculosis experiment as follows—"The next step in the tuberculosis control program is the first step, namely, find the case."

This campaign is implemented by a number of freshly devised and effective pamphlets for lay consumption, under such arresting titles as Facts, Spots, Learn to Live, Step by Step, etc. We are advised that for the 1941 effort, the state and local tuberculosis associations have ordered over 7 million of these pamphlets for free distribution. Posters and other educational devices are also available for local tuberculosis associations free of charge. The new movement aimed at "The substantial eradication of tuberculosis by 1960," and the outstanding significance of preventable tuberculosis in our national defense program combine to make the 1941 Early Diagnosis Campaign worthy of the support of all interested in public health.

#### TO BE OR NOT TO BE—A DOCTOR

A deluge of books about doctors has drenched the literary field of late, but

few of them have succeeded in picturing the physician in as well rounded a manner as does a little 87 page booklet issued by the Public Relations Bureau of the Medical Society of the State of New York. The title of this little volume is "What It Means to Be a Doctor," and its author is Dwight Anderson, a layman who has had long association with physicians. The booklet attempts to depict the doctor—his character, his education, his ability, his skill—for the benefit of the young student contemplating a medical career.

The text of the booklet was compiled from information which the author received in answer to a written questionnaire sent to 500 medical men in general practice and in specialized fields. A few sample phrases and certain observations from the book will convey some impression of its interesting and varied nature:

"Their (doctor's) most common characteristic is a friendly and well-poised disposition coupled with a well developed capacity for tolerance."

"Honesty, optimism, courage, flexibility, love of work with the acquisition of money a secondary consideration, the urge to inquire, 'horse sense,' moral and intellectual integrity, personality, and scholarship are necessary to the physician."

"Medicine is a service given by one person to another person; it will never be anything else. It is not a commodity."

"Good medical care is founded on confidence and free choice."

The whole of a doctor's career including his participation in professional societies, his work with lay educational groups, his internship, his financial status, and other elements that shape his career are set forth in "What It Means to Be a Doctor."

This booklet deserves wide reading, not only on the part of prospective medical students, but by everyone in-

terested in the future of the medical profession. Copies may be secured at a cost of 75 cents each by writing to the Medical Society of the State of New York, 292 Madison Avenue, New York, N. Y.

#### THE VANISHING POINT

An achievement in preventive medicine that deserves more than passing mention was announced recently by public health authorities of the City of Toronto, Canada. Reports for 1940 showed that not one case (we said *case*, not death!) of diphtheria had occurred in that city during the year! It is believed that this establishes a new world's record for diphtheria control in a city of Toronto's size. Credit for this amazing record was attributed to the annual toxoid campaigns which the city has carried out in coöperation with the Health League of Canada since 1929.

This remarkable demonstration by our Canadian colleagues will inspire many health workers here to push diphtheria further and further toward

the vanishing point in communities throughout the United States.

#### BY WAY OF EVALUATION

*Hygeia* (January, 1941—Page 25) sets forth a list of questions that every health educator might ponder "yea long and sorely" as new printed materials, posters, radio programs, etc., are contemplated. Here are some of them:

1. Will this catch the interest of the public?
2. Will it reassure, rather than frighten?
3. Is it certain not to precipitate morbid, neurotic concern with disease?
4. Will it encourage reasonable optimism, justified by the results of treatment, without obscuring the essential seriousness of the problem?
5. Will it tend to replace fear and ignorance with an attitude of alertness and courageous intelligence?
6. Will it build confidence in the family physician?

By way of evaluation, why not measure some of your efforts by these questions? Any health education material that passes the test of these queries is certainly fulfilling a vital purpose.

#### MAGAZINE ARTICLES

Current popular magazine articles on health or of medical import:

- "The Mystery of Aging." George W. Gray. *Harpers Magazine*. February, 1941.
- "Are You Walking Around With a Nervous Breakdown?" Margaret Case Harriman. *Ladies' Home Journal*. February, 1941.
- "The Interne." No Author Given. *Life*. January 20, 1941.
- "Medical Miracles of the Year." Waldemar Kaempffert. *Look*. January 28, 1941.
- "The Case of the Missing Mosquitoes, et al." Edward M. Brecker. *Scribner's Commentator*. February, 1941.
- "Eating Their Way to Health and Learning." J. D. Ratcliff. *The Kiwanis Magazine*. February, 1941.
- "A Long Life and a Healthy One." Bruce Bliven. *The New Republic*. January 13, 1941.
- "Strep Throat." Maxine Davis. *Good Housekeeping*. February, 1941.
- "Modern Miracle Women." Maxine Davis. *Cosmopolitan Magazine*. March, 1941.
- "Fighting the Flu." Mona Gardner. *Atlantic Monthly*. February, 1941.

(The above is not presented as a complete list and the articles cited are not necessarily recommended.)

### A MEDICAL SCHOOL IN HEALTH EDUCATION

It comes as good news to learn that the University of Buffalo (N. Y.) School of Medicine has inaugurated a health education project designed for the citizenry of Buffalo and Western New York. This project embraces a series of lectures designed to acquaint the average man and woman with medicine's newest developments in preventing and treating disease. The lectures, given by leading medical men, are heard on alternate Sunday afternoons in the medical school's amphitheater. Lecture subjects announced are: "What You Should Know about Syphilis," "Carcinoma in Women," "Appendicitis—How to Suspect It and What to Do about It," and "Your Food and Your Health."

Public interest in this project was demonstrated when a packed auditorium greeted the first lecture.

An enterprise such as this is further proof that medical schools can play a most important rôle in community health education. It is to be hoped that other institutions will follow the example set by the University of Buffalo, and certain other schools.

### NO PLACE LIKE A HEALTHFUL HOME

The U. S. Public Health Service has compiled a list of essentials that are necessary to a healthful home environment. They are as follows:

1. A pure and sufficient water supply
2. A safe milk and food supply
3. Sanitary refuse and sewage disposal
4. Sufficient ventilation, heat, and light
5. Space enough for ordinary family demands
6. Absence of excessive dampness
7. Screening against flies and mosquitoes
8. Protection against other insects and rodents
9. Protection against fire hazards and other accident risks
10. Adequate play space and sunshine for children

Sanitarians and health educators have long advocated these essentials to healthful living. Many of these factors are

now firmly grounded in the public consciousness, while others are still matters of casual concern or indifference.

A group of psychologists has suggested that an additional item be added to this list. They maintain that every household needs at least one member who is given to singing, as singing, when competently done, creates that cheerfulness necessary to a healthful home environment!

### MISCELLANEOUS COMMENTS

The job of the student health director has been well described by Wilbur H. York, M.D., Chairman of the Department of Health and Physical Education of Princeton University. As expressed by Dr. York, the student health director must "create in the mind of the student an attitude toward health that will make it possible for him to study his own requirements as to rest, diet, and his disease tendencies without developing in him an abnormal health consciousness and a habit of introspection. To do this requires insight and sympathetic understanding of the many problems of youth."

Bioclimatology is the name of a new course offered by Pennsylvania State College. It deals with the effect of climate on life and is believed to be the first course of its kind taught in this country, with the possible exception of the work of Huntington at Yale, or Mills at Cincinnati. The problem of proper location of health resorts and tuberculosis sanatoria, as well as the significant effects of climate on health, will be studied in this course.

A correspondent asks us to select from the list of recent semi-scientific books two that we consider among those outstanding for purchase for a popular health library. We unhesitatingly recommend *Americans Live Longer*, by W. W. Bauer, M.D. (Published by

Bobbs Merrill Company), and *Germes and the Man*, by Justina Hill, M.D. (Published by G. P. Putnam's Sons).

The Michigan Tuberculosis Association and Affiliated Societies have issued an extremely clever folder entitled "It's a Cold World." Here one finds "Cold Facts about Colds"—what to do to keep from getting colds and what to do if you should catch one. The illustrations—all of which pertain to "cold weather"—are cleverly executed and tie in neatly with the text. This folder is an excellent example of how an inexpensive item can be made as effective and interesting as a more elaborate publication. It's all in knowing how!

The U. S. Public Health Service has furnished health workers with many valuable venereal disease publications dealing with syphilis and gonorrhea from almost every conceivable angle. The Service's latest publication entitled "Venereal Disease and National Defense" is another thoroughly useful and timely piece of literature. In this folder syphilis and gonorrhea are presented as "home front" problems which should challenge every town in America. The folder is executed along modern lines as regards typography and layout, and reflects considerable ability. The text is full of vital information that should bestir much thought and action on the part of those who read it.

The Ohio Department of Health has distributed an exceedingly amusing pub-

lication on home safety entitled "It's Papa Who Pays." Written in humorous verse form and illustrated with drawings reminiscent of the comic papers, this is a publication that must be seen and read to be appreciated. Accident situations of all types are encountered by poor Papa who comes home late from his lodge. The various situations are treated in a manner that borders on the old time slapstick comedy methods. The publication is downright funny, and at the same time puts over some important home safety information. The use of humor in health education is well exemplified in "It's Papa Who Pays."

The motion picture industry has swung into action to do its part in the nation's defense program. John Ford, one of Hollywood's top directors, has completed a 2,000 foot short subject called "Sex Hygiene." This film will be used for teaching purposes in Army Camps. Twentieth Century-Fox contributed its facilities and leading technicians likewise volunteered their services in making this film. The cast consists of professional actors in the speaking parts, assisted by army personnel. Medical advisers from the army supervised the technical aspects of the film. A second production entitled "Personal Hygiene" is to be produced in the near future. During 1941, Hollywood plans to contribute eight other shorts to the defense program. None of these films will be shown in theaters, as they are designed only for exhibition in army training camps.



## BOOKS AND REPORTS

L. Emmett Holt: *Pioneer of a Children's Century*—By R. L. Duffus and L. Emmett Holt, Jr. Foreword by E. A. Park. New York: Appleton-Century, 1940. 295 pp. Price, \$3.00.

Those interested in the history of child health in America have long waited for a biography of Dr. Holt for they have recognized the unique rôle which he played in the development of that movement. As a pediatrician and teacher he has long been acclaimed, but his contributions to public health and child welfare and his assistance in fostering the development of scientific medicine have been less well understood. And the story of his life indicates why this is so. He gave the world no outstanding scientific discovery, and he served in no large public health office. But careful analysis shows that his popular little book *The Care and Feeding of Infants* (growing out of a 4 page pamphlet issued for nursemaids) led to a widespread dissemination of the best information about child care; that his text, *The Diseases of Infancy and Childhood*, kept practitioners currently informed of the latest and best in pediatrics; and that his great interest in preventive pediatrics assisted in the acceptances of the use of diphtheria antitoxin, of clean milk, and of the continuous health supervision of infants and children.

Later as president of the Child Health Organization he fostered the coöperation of educators, advertisers, school teachers, popular magazine executives, and parents, in bringing the best knowledge of child hygiene to both children and their parents in popular fashion.

All of these are significant factors in

the development of public health as we know it today. Even in his final presidential address at the American Pediatric Society (of which he was a founder and twice elected president), he raised a pertinent and unsolved problem—how to cement the practitioner, the health expert, and the laboratory experimenter into a functioning unit, and how to keep each in touch with the other.

In 1919, Dr. Holt performed one additional service to the public health field in acting as secretary to the Cannes Conference of Red Cross organizations of different nations, a conference that contributed to the formation of the Health Organisation of the League of Nations and the Junior Red Cross. Dr. Holt also assisted in interesting Mr. Rockefeller in founding the Rockefeller Institute for Medical Research, and served as secretary of its board for years. Here and in his own Babies' Hospital he was able to foster many studies of scientific importance, even if his own work in the laboratory was limited.

The biography itself is simply written by his son and a well known newspaper writer and they have made extensive use of Dr. Holt's letters to and from his own family to tell the story. This reviewer wishes more letters to his professional associates might have been included for they might seem, from the few examples given, to have thrown other lights on his character and accomplishments.

A picture of the development of pediatrics in America was inevitable when Holt's life was written, but that one of the authors of this volume is an important pediatrician as well as Dr.

Holt's son has been unusually fortunate for the reader, and the resulting picture of pediatric practice from 1878 to 1923 will benefit those who are less interested in the intensely human story which is told. Pediatricians will also be interested in the excellent foreword from the pen of Dr. E. A. Park, Professor of Pediatrics at the Johns Hopkins University.

LEONA BAUMGARTNER

**Methods of Analysis, Official and Tentative, of the Association of Official Agricultural Chemists—(5th ed.)** Washington (P. O. Box 540): Association of Official Agricultural Chemists, 1940. 757 pp. Price, \$5.00.

The fifth edition of this well known compilation of methods marks another triumphal milestone by bringing up to date the standardization of analytical chemical procedures for the examination of agricultural and related articles of commerce. The publication is unique in that it is not the compilation by one author of selected methods but is the result of a well organized plan for collaborative research work to prepare methods of such accuracy that analytical results obtained thereby will be recognized in court testimony. The name of the book does not reveal that the methods deal predominantly with foods or that 80 pages are devoted to methods for the analysis of drugs. Workers in the fields of food and nutrition are fully aware of our immediate and daily dependence upon the food producer, packer, and distributor for quality foods. They know, too, of the active though inconspicuous part played by the methods of analysis observed by the Association of Official Agricultural Chemists in protecting the consumer's health and his purse. What these methods bring to light not only prevents the sale of dangerous and partially decomposed foods and drugs, but prevents also the

sale of foods and drugs of inferior or deceptive quality, or puts into effect the requirement that they must carry a conspicuous label to indicate such facts when they are offered for sale.

Four new subjects are included in this edition: Fish and Marine Products; Microchemical Methods; Vitamins; and Microbiological Methods. The last two of these sections will interest the nutritionists and sanitarians respectively. Improved and new methods are described for the determination of filth and decomposition in foods. The section on microbiological methods outlines procedures for the examination of frozen eggs and canned vegetables and for the estimation of the numbers of thermophilic bacteria in sugar.

A. H. ROBERTSON

**Report of the Sex Question—By The Swedish Population Commission, Stockholm, 1936. Translated and edited by Virginia Clay Hamilton, M.D. Foreword by Warren G. Thompson. Published for the National Committee on Maternal Health, Inc. Baltimore: Williams & Wilkins, 1940. 182 pp. Price, \$2.00.**

Public health workers in this country have generally looked upon voluntary factors in birth rates as purely private matters. We thus ignore as irrelevant induced abortions, irresponsible sexual promiscuity or commercial prostitution, and certain emotional and mental aspects of adjustment. In this report the Swedish Commission discusses the "ethical principles involved in contraception," but makes clear the bearing of the issue on social and personal hygiene.

The commission notes that even for the "absolutists" contraception has already been legitimized not alone with respect to the life and health of the mother, or to the health of prospective children, but also with respect to reliance upon "safe periods." To the objection that contraceptive practices

make sex activities conscious and "rational," the commission replies that the monogamic ideal is itself an attempt to rationalize and regularize sex, and making procreation and parenthood voluntary rather than casual and accidental is in harmony with the ethical principle of responsibility as well as with the cultural demand for control of sex impulses.

In a democratic society we cannot meet the danger of extreme birth restriction to the national life by inducing people to beget children they do not want, nor by disregarding the deeper needs of the personalities involved. The commission recommends an interrelated program of (a) social reforms for economic security and living conditions that are essential for the kind of home and family life we consider desirable; and (b) educational and cultural efforts that would make the desire for children and satisfaction with children integral parts of life's aspirations. The section on "sexual enlightenment" assumes a broad scheme of education for parenthood and for more direct attention to the needs of youth.

BENJAMIN C. GRUENBERG

**A Research Conference on the Cause and Prevention of Dental Caries, 1938—Chicago: The Good Teeth Council for Children, 1940. 178 pp. Price, \$2.00.**

This highly technical discussion will probably be of greater interest and value to public health bacteriologists, chemists, and dentists than to the general public or even to those engaged in the more administrative aspects of public health activities.

The reports as a whole indicate that there was not a unanimity of opinion among the Conference participants as to the cause of dental caries, even while particular credence seems given to the belief that carbohydrate consumption is a causative factor. These, however, are not the most important inferences to be

derived from a study of the papers making up this volume. More important is the encouraging impression one gains in reading the book that honest, scientific, worth while efforts are being applied to the solution of the problem of dental caries, and that, given time and proper financing, there is every reason to believe the problem can and will be solved.

The high caliber of the participants in their respective fields is such that the book should attract the attention of all those interested in this phase of public health.

RICHARD C. LEONARD

**The Streptococci—Their Descriptions, Classification and Distribution, with Special Reference to Those in Milk—By William D. Frost, Ph.D., Dr. P.H., and Mildred A. Engelbrecht, Ph.D. Madison, Wis.: Willdorf Book Co., 1940. 172 pp. Price, \$4.25.**

Everyone who is interested in milk streptococci and their relationship to public health will want to read this book. A vast amount of data is given on the occurrence of streptococci in the cow's udder in health and disease, with interpretations of their significance to human health. The chapter on the historical development of our knowledge of the streptococci in milk brings interesting facts together in a scholarly discourse. Methods used for the isolation and study of streptococci are described in detail.

The investigations on which the treatise is based were undertaken and carried out for the practical purpose of keeping a raw milk supply produced on several large farms free from streptococci capable of causing disease in man. The studies, which included the streptococcal flora in the throats of dairy employees, extended over a period of more than a decade. The authors were especially concerned with *Streptococcus epidemicus* Davis, which causes septic sore throat in man.

During the years when these studies

were in progress various investigators published data which made it possible to distinguish hemolytic streptococci capable of infecting man from those capable of infecting only the lower animals. The distinctions may now be made on the basis of precipitin reactions, fermentation of trehalose and sorbitol, and sensitivity to bacteriophage. The authors frankly admit that during the early years of their studies they regarded as *Streptococcus epidemicus* strains which they now know were of bovine origin. They have given an appropriate name to the animal streptococcus which caused the confusion—*Streptococcus zoëpidemicus*. This specific name should be accepted to replace the designation "animal pyogenes" which is commonly used.

Another species name introduced by the authors is appropriate and fills a need in streptococcal nomenclature. After Holman's classification all streptococci which failed to ferment lactose were often carelessly designated *S. equi*; or they were designated *S. pyogenes* B 1, a name which does not fulfil the rules of nomenclature. The authors give the specific name *S. equisimilis* to the group which resembles *S. equi* in inability to ferment lactose, but otherwise differs from *S. equi*. They do not state definitely whether this name is to be applied to streptococci of Group A or Group C (there are strains of both groups which fail to ferment lactose); but their statement that "pyogenes B" is a synonym indicates that the name *S. equisimilis* should be applied to the strains of Group C, because "pyogenes B" is a name which was given to strains of animal origin.

In the chapter on descriptions of beta hemolytic streptococci the authors fail to clarify the confusion which was introduced into the nomenclature of streptococci when Rosenbach designated as *S. erysipelatis* the streptococcus which Fehleisen found to be associated with

erysipelas, and when Klein designated as *S. scarlatinae* the streptococcus associated with scarlet fever. In the days of those early bacteriologists when the characters now used for the differentiation of streptococci were unknown, it was excusable to regard disease source as a distinguishing character. But it is now generally recognized by those who have studied streptococcus types in connection with the epidemiology of human streptococcal diseases, that a single species, or even a single agglutinative type may cause a variety of diseases, including erysipelas and scarlet fever. Obviously, then, any classification of streptococci based primarily on disease source is invalid.

There appears to be confusion also in regard to the species *S. infrequens*. Its description as a fermenter of sorbitol is irreconcilable with the statement of Holman, who first described the species, that he obtained it from many human disease sources. (Strains from human disease sources do not ferment sorbitol.)

The statement that Schwartzman and others found a specific bacteriophage for a group of organisms with the fermentation reactions of *S. pyogenes* is incorrect. The group of organisms which Schwartzman found to be sensitive to his phage has the fermentation characteristics of *S. subacidus*, as described by Frost and Engelbrecht. To this group the name *S. erysipelatis* has been applied in some of the literature of the last 15 years. All of this confusion emphasizes the need for a thorough investigation of streptococcus problems.

ALICE C. EVANS

Wonder Stories of the Human Machine—By George A. Skinner. Ten pamphlets reprinted from *Hygeia*. Chicago: American Medical Association, 1939. Price, \$1.00 for set (15¢ each).

This is a description of the human body and is divided into 10 separate

pamphlets of less than 20 pages each; a light box file is supplied to hold the pamphlets. Each deals with one or more aspects of anatomy and physiology. Number one is entitled *The Framework (Bones)*; number two, *The Running Gear (Muscles)*, and so on. At the end of each pamphlet are 12 questions concerning the subject matter discussed in the text.

As might be anticipated from their authorship, these stories are clearly and authoritatively written. They ought to be of great use to teachers of hygiene.

MERRILL E. CHAMPION

**Graduate Medical Education—**  
*Report of the Commission on Graduate Medical Education. Chicago: University of Chicago Press, 1940. 304 pp. Distributed Free by the Commission on Graduate Medical Education.*

This book presents the report of a distinguished commission consisting of leaders in the field of medical education, the various phases of medical practice, and the field of hospital administration. The opening chapter contains a summary of the entire report which is a departure from the more usual procedure of summing up at the end of a presentation. This method serves to clarify the subject in the reader's mind right at the beginning.

The committee discusses graduate medical education under three major headings: the internship, the residency, and postgraduate medical education. Objectives and standards are set forth for each of these classifications.

The internship should be considered as part of the basic preparation of the student for general practice; in addition it should provide him with the foundation on which he can, by graduate training, develop proficiency in a specialty. The committee recommends a "General Internship" of the rotating type, with time devoted to general medicine, pediatrics, obstetrics, surgical diagnosis,

minor surgery, and first aid and emergencies. A period of 12 months is thought to be most generally applicable. The educational aspects of the service are to be stressed, and tasks which do not produce educational results sufficient to justify the time and effort expended should be lifted from the intern's shoulders. Thus "ambulance riding" should be eliminated, and the anesthesia service for interns should be dispensed with. In addition it is recommended that laboratory work be done only in connection with patients actually followed by the intern.

This recommendation of a rotating internship differs from the policy followed by many of our leading hospitals particularly in the large eastern educational centers where straight medical or surgical internships have long been the vogue.

The residency, according to the commission, should be designed to enable a physician to make himself proficient in a specialty and to give him the educational background for continued development in this field. A period of 3 years with part of this time spent in the basic sciences is recommended. The work of the Advisory Board for Medical Specialties is explained.

Postgraduate medical education, the committee states, is designed to keep a man abreast of his own field, but not to qualify him to enter a new type of special practice. There are two types of postgraduate medical education—(a) for the general practitioner, and (b) for the specialist. Recommendations are made for each type.

There is also a chapter outlining the status of postgraduate medical education in Great Britain. The book closes with appendices giving various types of statistics concerning internships and residencies, and a section showing some existing plans of postgraduate education.

The United States is at present on the verge of a new era in graduate medi-

cal education, and this study serves a valuable purpose in collecting data on the systems in use in various parts of the country, and in charting a course for the future. CHARLES F. WILINSKY

**Emotion and Conduct in Adolescence**—By *Caroline B. Zachry*. New York: *Appleton-Century*, 1940. 563 pp. Price, \$3.00.

The fundamental thesis, as developed in this excellent text, is that if the school is to fulfil its function in understanding and meeting the needs of students in their social relationships and development, it must enlist instructors who, in addition to having an interest in the personality of the student, have an insight into their own. Such an instructor will realize his own limitations and will appreciate the importance of the conference method where teacher, school doctor, nurse, psychiatrist or other specialist, pool their observations and judgments. Such an instructor will realize, too, the value of cumulative records as to health, physical, intellectual, and emotional growth and development, and social adjustment; but at the same time he will realize that the best record does not take the place of personal responsiveness, the chemical reaction of one to another. The author points out that such an instructor, with interest in assisting in the social development of the adolescent, will refrain from too much "digging" and will often be content to watch and wait. He will realize the interrelationship of physical and psychological factors in the maturing of the student.

Emphasis is placed on the teacher's realization of sex differentiation in the concepts and behavior of adolescents. The adolescent's concern with his changing body must be recognized, and the objectivity of his attitude to such changes promoted through courses in hygiene and biology as part of the general curriculum. The section on sex

education is refreshing in its common sense approach. The author points out that the attitude of the teacher in this field is just as important as the facts taught, that "no teacher should proceed further than he can comfortably go" and that the school should not urge instruction on this topic by those who are "unready or overeager."

The adolescent, in his attitude to changing persons and relationships, experiences a conflict between the desire for affection and security, on the one hand, and for emancipation and freedom, on the other. The wise counsellor will steer between the Scylla of paternalism and the Charybdis of emotionally sterile objectivity.

The attitudes of the adolescent to basic social institutions such as choosing a vocation, citizenship, and marriage are outlined with pertinent case histories. Particularly illuminating are the author's observations on the relationship of unemployment to the adolescent's development. The goal of adolescent education is defined as the utilization of experience in achieving social maturity.

Grateful readers of this volume will welcome further observations from Dr. Zachry and her associates as to the means of finding and training teachers adequate to meet the needs of adolescent education. ALBERT McCOWN

**Fundamentals of Bacteriology**—By *Martin Frobisher, Jr.* (2nd ed.) Philadelphia: *Saunders*, 1940. 653 pp. Price, \$4.00.

This is a second edition which very considerably revises, improves, and brings up to date a textbook that has been in print only 3 years. The choice of the word "Fundamentals" in the title is a happy one for it is descriptive of the character of the book; the title "Microbiology" would have been more apt than "Bacteriology" for the reason that this 650 page, attractively and sturdily bound, unusually well printed

and proof-read volume deals broadly and without specialization with the fundamentals of the biology that may be seen under the microscope.

The author has so well succeeded in presenting his thesis that "from a cultural and philosophical standpoint, a view of bacteria not exclusively as parasites but as microscopic plants having the most interesting and valuable synthetic and analytic powers, not only increases one's general usefulness, but greatly broadens his view of life and sharpens his appreciation of the subtlety of nature," the student using this text will have concisely, thoroughly, philosophically, and interestingly placed before him the essential facts about microorganisms and their environmental relationships in a way to give him either sound cultural training or a solid foundation upon which to specialize.

The 326 illustrations—most of which really enhance the text—have been appropriated from every available source, credit carefully given, and thought has been taken to make the accompanying titles informative. The table of contents and the index are surprisingly complete.

The presentation is unusual but very logical; the diction occasionally a little archaic but the statements seldom ambiguous. Undue stress has not been laid upon the medical, the agricultural, or the industrial aspects of microbiology. In the historical introduction the author has selected well, and proper attention has been given to morphology and structure, to nutrition and metabolism, and to staining and sterilization operations. The promise to use one system of nomenclature—*Bergey's Manual*, 5th ed.—has been adhered to more closely than is often the case. Heading many chapters with interesting designations like "The 'Little Bacteria,'" "The Spiral, Flexible Bacteria" (followed each time by the name of the Order), lends a charm to the book and should stimulate

the reader's interest in the contents; in addition, each of these chapters is headed by an outline of the systematic relationships. While the immunological phases may be stressed less than is customary, this is not the usual lopsided medical approach. Ultramicroscopic viruses are treated succinctly but well. In an interesting chapter on "Bacterial Associations" bacterial synergism is especially well presented following the observation—rather characteristic of the author's style—that in theology synergism signifies "the combined action of the human being and the divine grace in the salvation of the soul." The student who masters this text has been appropriately introduced to microbiology.

FRIEND LEE MICKLE

**Elementary Bacteriology: History, Fundamentals, Pathogenic and Non-pathogenic —** *By Joseph E. Greaves and Ethelyn O. Greaves (4th ed.) Philadelphia: Saunders, 1940. 587 pp. Price, \$3.50.*

This fourth edition of an elementary textbook of bacteriology contains some new material with a few new illustrations. Several chapters have been rewritten and some of them expanded; a chapter on "Syphilis," a classification chart of the Class Schizomycetes, and other material have been added.

This book is rather more pretentious than many elementary textbooks, and it covers medical, public health, agricultural, and industrial aspects of bacteriology rather thoroughly, even with a wealth of detail that must be bewildering to many students. One wonders how a textbook reaches a fourth edition without a weeding out of the extraneous details that would not be out of place in a teacher's lecture notes but which continually tend to distract the reader's interest.

The volume is rather well illustrated. At the end of each chapter appears a list of questions that rather pertinently

emphasize the points that have been developed.

While the subject matter presented is adequate for a college course of bacteriology, the style of presentation seems adapted to persons of high school age. One example taken at random from many similar statements that abound throughout the book should suffice to illustrate a style of writing that greatly annoys your reviewer. In the chapter on "Immunity," in a description of what happens when immunological defenses fail to stop infection, we read "Something happens—we call it death

—and the micro-organisms quickly enter all the tissues. If it is a friend who is thus attacked and we are far distant, we have to hurry to obtain a last fond look before the wrecking crew tears the body to pieces."

This book is attractively bound and well printed, and it contains much good, strong bacteriology; however, the arrangement of material could be improved and a pruning out of unnecessary detail, together with the free use of an editor's pencil, should improve the context and make the book more useful to students. FRIEND LEE MICKLE

## BOOKS RECEIVED

TEXTBOOK FOR MALE PRACTICAL NURSES. Gayle Coltman. New York: Macmillan, 1941. 215 pp. Price, \$2.00.

SOCIAL AND ECONOMIC ASPECTS OF SWEDISH POPULATION MOVEMENTS, 1750-1933. By Dorothy Swane Thomas. New York: Macmillan, 1941. 487 pp. Price, \$6.00.

A TEXTBOOK OF CLINICAL PATHOLOGY. Edited by Roy R. Kracke & Francis P. Parker. 2d ed. Baltimore: Williams & Wilkins, 1940. 780 pp. Price, \$6.00.

FUNDAMENTALS OF ADMINISTRATION FOR SCHOOLS OF NURSING. New York: National League of Nursing Education, 1940. 270 pp. Price, \$2.50.

IN A MINOR KEY. NEGRO YOUTH IN STORY AND FACT. By Ira DeA. Reid. Washington: American Council on Education, 1940. 134 pp. Price, \$1.25.

FEEDING OUR OLD FASHIONED CHILDREN. By C. Anderson Aldrich and Mary M. Aldrich.

New York: Macmillan, 1941. 112 pp. Price, \$1.75.

PLUMBING AND PUBLIC HEALTH. By Arthur B. Cronkright and Arthur P. Miller. Washington: Government Printing Office, 1940. 118 pp. Price, \$.30.

GUIDE TO LIBRARY FACILITIES FOR NATIONAL DEFENSE. Preliminary Edition. Edited by Carl L. Cannon. Chicago: American Library Association, 1940. 235 pp. Price, \$1.25.

COFFEE: A COLLECTION OF MEDICAL ABSTRACTS. By Milton M. Bridges. New York: Pan-American Coffee Bureau, 1940. 64 pp.

T. N. T. POISONING (TRINITROTOLUENE): INFORMATION FOR EMPLOYERS AND EMPLOYEES. Ottawa, Canada: Department of Pensions and National Health, 1940. 8 pp.

FOODS AND NUTRITION. By Fern Silver. New York: Appleton-Century Co., 1941. 522 pp. Price, \$1.72.



## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

**Persistence of Diphtheria Immunity**—About a seventh of the children treated with 3 doses of toxoid were found Schick positive 5 to 11 years afterward. It is suggested that all children immunized in infancy be given another injection at school entrance age if a Schick test is not done at that time.

BENJAMIN, B., *et al.* Results of Schick Test in Children One to Ten Years after Injections of Toxoid. *Am. J. Dis. Child.* 60, 6:1304 (Dec.), 1940.

**Wartime Immunization Practice**—In this series of lectures, immunizations against the bacterial infections of typhoid, cholera, and plague; against the toxins of tetanus and diphtheria; and against the virus and rickettsial diseases, smallpox, rabies, yellow fever, typhus fever, and trench fever, are all discussed from the standpoint of British military experience.

BENSTED, H. J. Modern Practice in War-time—Immunization of Soldiers and Civilians. *J. Roy. Inst. Pub. Health & Hyg.* 4, 1:7 (Jan.), 1941.

**Harking Back to 1918**—Experience is a valuable teacher. In anticipating the job of rehabilitating the registrants disqualified under the 1940 Conscription Act, the findings of the "second million" drafted in 1918 provide a useful basis for assumptions. Here you can read an excellent summary of those findings.

BRITTEN, R. H., and PERROTT, G. St. J. Summary of Physical Findings of Men Drafted in the World War. *Pub. Health Rep.* 56, 2:41 (Jan. 10), 1941.

**Syphilis Contacts**—Case finding methods produce results when intelligently applied. An average of two names of contacts per case were obtained and three-fourths of the contacts of early syphilis cases had syphilis. About one new case from each early case can be found, and that is surely worth while.

CLARK, E. G. Studies in the Epidemiology of Syphilis. *V. D. Inform.* 21, 11:349 (Nov.), 1940.

**Venereal Patients Are Human**—Many papers have been written about the treatment of syphilis, but we hear much less about the human beings who are the victims. So this brief note on the social implications of the disease comes as a wholesome reminder that the person is as important as the case as a unit in our nation-wide administrative project to stamp out syphilis.

COOK, J. Special Problems Caused by Syphilis. (New Jersey) *Pub. Health News.* 24, 6:181 (Dec.), 1940.

**A Gonococcus Filtrate Skin Test**—To aid in the diagnosis of gonorrhea and as a criterion of cure, a skin test is added to the smear, culture, and complement-fixation reaction. The authors hold it to be more valuable than the other three except when sulfanilamide has been employed.

CORBUS, B. C., and CORBUS, B. C., JR. The Cutaneous Diagnosis of Gonococcal Infections. *J.A.M.A.* 116, 2:113 (Jan. 11), 1941.

**Aid for Mass TB. Testing**—A good word is said for fluorography with the 35mm. film and portable equipment

which is now commercially available. Though there are adjustments which require expert judgment in making the pictures, and special experience is needed in reading small films, the method can be employed where no other could be used.

DEARING, W. P., and TURNER, A. E. Chest Fluorography with Portable X-ray Equipment on 35mm. Film. Pub. Health Rep. 55, 52:2369 (Dec. 27), 1940.

**More than Art of Medicine Needed**—Part II of this inquiry into the training of health personnel uncovers the lack of adequate preliminary training which exists among many of the employed medical health officials. The rapid expansion of health services has accentuated the need for either intensive graduate courses or the expansion of in-service training.

DERRYBERRY, M., and CASWELL, G. Qualifications of Professional Public Health Personnel. Pub. Health Rep. 55, 52:2377 (Dec. 27), 1940.

**The Eighteen Per Cent Who Are Chronically Sick**—After 40 is reached persons with chronic disease, though only a small group numerically, are responsible for the lion's share of sickness, disability, and mortality. How to lessen this burden of the ambulatory person with chronic disease is a problem with which public health leaders must struggle.

DOWNES, J. Chronic Disease among Middle and Old-age Persons. Milbank Quart. 19, 1:5 (Jan.), 1941.

**V. D. and Defense**—The greatest single health problem today is syphilis and the most troublesome social problem is prostitution. So says the chief of the Navy's division of preventive medicine. Gonorrhea is the army's principal problem, for 4.5 per 1,000 men are absent from duty constantly because of the disease. There is no disagreement about the most troublesome social prob-

lem. What communities should do is the subject of this important symposium.

DUNHAM, G. C., *et al.* Social Hygiene and National Defense. J. Social Hyg. 26, 9:393 (Dec.), 1940. (Note: the January, 1941, issue, 27, 1 is devoted to an extension of this subject and should be read in connection therewith.)

**More about Dental Caries**—It appears that the incidence of caries is affected by the amount of sunshine the child gets. Health workers are urged to give thought to vitamin D when concerned about dental caries.

EAST, B. R., and KAISER, H. Relation of Dental Caries in Rural Children to Sex, Age, and Environment. Am. J. Dis. Child. 60, 6:1289 (Dec.), 1940.

**Laboratory Aids to the Diagnosis of Flu**—A promising aid to the epidemiologic study of influenza is the complement-fixation test which gives dependable information in most cases 10 to 14 days after onset.

EATON, M. D., and RICKARD, E. R. Application of the Complement-Fixation Test to the Study of Epidemic Influenza. Am. J. Hyg. 33, 1:23 (Jan.), 1941.

**Influencing Adult Behavior**—As public health education is essentially adult education, and as much of public health administration is educative, then a great many sanitarians should be interested in what is going on in the minds of the adult educators. You'll find much of interest in this abridged report of their annual meeting.

ELLIS, A. C., *et al.* Agencies for Adult Education (and) ADAMIC, L., *et al.* Specialized Programs of Adult Education. J. Adult Ed. 12, 4 (Part 2) :461 (Oct.), 1940.

**Some Questions for the School Nurse**—School nursing service as a part of a generalized public health nursing program is analyzed principally by means of a series of questions about nursing procedures, attitudes, and records. Public health nurses must be

made always more aware of opportunities for effective teaching during their contacts with pupils, parents, and teachers.

FULLER, A. Public Health Nursing Service for the School Child. Trained Nurse & Hosp. Rev. 105, 6:451 (Dec.), 1940.

**Progress Report**—Nineteen months' experience with the New Jersey prenatal blood test law indicates that the provisions are being carried out successfully; there is a definite tendency toward earlier tests; an increasing number of positive women are getting treatment; fewer cases in babies and children are being reported. Another encouraging sign is the increasing interest and cooperation of practising physicians.

HALL, J. Prenatal Blood Tests for Syphilis. (New Jersey) Pub. Health News 24, 6:178 (Dec.), 1940.

**Leptospira Icterohaemorrhagiae**—Seven young men went bathing in a pool near a farm yard. It was probably polluted by rats, for each contracted a leptospirosis. Five were mildly sick, two severely so, and one died. There is a moral here for health educators.

HAVENS, W. P., *et al.* Leptospirosis: a Public Health Hazard. J.A.M.A. 116, 4:289 (Jan. 25), 1941.

**Instead of Subsidies**—Two-thirds of the population resides in towns where small families predominate. Just what can be done to release new fertility in the urban civilization we are developing had better be studied well. In the meantime there is good reason to do more to guard the health, safety, and training of those who are being ushered into this troubled world.

KISER, C. V. Social Implications of the Under-Developed Family. Milbank Quart. 19, 1:26 (Jan.), 1941.

**Infant Exercises**—You will be delighted with the photographs of this infant gymnast even though you may not be convinced of the value of organized gymnastics for 4 month old babies. The pediatricians will have to decide how much merit there is to this novel proposal.

KLEIN, M. Gymnastics for Babies. Trained Nurse & Hosp. Rev. 105, 6:446 (Dec.), 1940.

**The Child in His Family**—Please don't miss this perfect paper even though you have nothing to do with child hygiene or have no young children of your own. It is a sound scientific treatise, but in it you will find no "inhibitions," "libidos," "fixations," or any other trade marks of the newly-arrived scientific writer. Instead you'll find it replete with quotable, homely observations.

SWEET, C., *et al.* The Child-Parent Relationship. J.A.M.A. 116, 1:38 (Jan. 4), 1941.

**Who Shall Be Responsible for Mental Health?**—Should suicide concern a health officer less than deaths from typhoid or diphtheria? Is a mentally dead person maintained for 40 years at public expense less a community problem than a person dead of smallpox? Who doubts but that preventable mental illness is a frequent cause of juvenile delinquency and the mounting divorce rate? The primary condition for a mental hygiene project is that it shall be a public health program.

VOGEL, V. H. Mental Hygiene in the State Health Department. Pub. Health Rep. 56, 1:1 (Jan. 3), 1941.

## ASSOCIATION NEWS

### APPLICANTS FOR MEMBERSHIP

*The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.*

#### *Health Officers Section*

- Lorne W. Bell, M.A., 2328 W. 7th St., Los Angeles, Calif., State Health Supervisor, National Youth Administration
- William V. Bessonette, M.D., Old Federal Bldg., Texarkana, Tex., Director, Texarkana-Bowie County Health Unit
- Roger M. Burgoyne, M.D., 9 Mt. Vernon St., Winchester, Mass., Health Officer, Winchester Board of Health
- Francis B. Elder, M.S.P.H., 6 Golf Court, Teaneck, N. J., Health Officer
- Earle C. Gates, M.D., M.P.H., Health Dept., Chesterfield, Va., Health Officer
- Irving D. Johnson, M.D., C.P.H., Sutter-Yuba Health Unit, 309 C. Street, Marysville, Calif., Bi-county Health Officer
- Fred L. Ogilvie, M.D., Caruthersville, Mo., Pemiscot County Health Officer
- Paul Q. Peterson, M.D., Hardinsburg, Ky., Health Officer, Breckinridge & Meade Counties
- Roy M. Seideman, M.D., Dr.P.H., 135 North 13th St., Olean, N. Y., Asst. Commissioner of Health, Cattaraugus County Dept. of Health
- Mary Steichen, M.D., 341 East 25th St., New York, N. Y., Health Officer-in-training, New York City Dept. of Health

#### *Laboratory Section*

- Gatlin R. Brandon, M.S., 1724 S. W. Broadway, Portland, Ore., Bacteriologist, State Board of Health
- Miriam E. Herdegen, B.S., 1015 Foulkrod St., Philadelphia, Pa., Graduate Student, Bacteriology and Public Health, Univ. of Pa.
- E. Harold Hinman, M.D., Tennessee Valley Authority, Wilson Dam, Ala., Senior Biologist, Health and Safety Dept.
- Sidney O. Levinson, M.D., 2912 Ellis St., Chicago, Ill., Director, Samuel Deutsch Convalescent Serum Center
- Edward R. Mugrage, M.D., 4200 East Ninth Ave., Denver, Colo., Professor and Head, Dept. of Public Health and Laboratory

Diagnosis, Univ. of Colorado School of Medicine

- Bernard Rosenberg, B.S., 322 Main St., Stamford, Conn., Director, Stamford Medical Laboratory

#### *Vital Statistics Section*

- Hubert E. Brogden, Ph.D., 1105 W. Edwards St., Springfield, Ill., Senior Statistician, State Dept. of Public Health
- Bernard G. Greenberg, B.S., 265 Morris St., Albany, N. Y., Junior Statistician, Bur. of Pneumonia Control, State Dept. of Health
- Julius Guttentplan, B.S., 17 Oxford Ave., Buffalo, N. Y., Statistician, District Health Office, State Dept. of Health

#### *Engineering Section*

- Leslie E. Corkill, B.S., 901-6th Ave., Helena, Mont., Sanitary Inspector, State Board of Health
- William P. Hughes, City Hall, Lewiston, Ida., City Engineer and Water Superintendent
- William Q. Kehr, B.S. in C.E., 723 Houchin St., Jefferson City, Mo., Asst. Public Health Engineer, State Board of Health
- Raymond I. Leland, M.S. in C.E., Manteno State Hospital, Manteno, Ill., Sanitary Engineer
- John W. Lemon, B.Sc., 923 Court House, Atlanta, Ga., Asst. Public Health Engineer, Fulton County Health Dept.
- Melvin J. Olsen, 4880 8th Ave., Sacramento, Calif., County Sanitary Inspector, Sacramento County Health Dept.
- G. M. Ridenour, Ph.D., Box 723, State College, Pa., Assoc. Professor in Sanitary Engineering, Pennsylvania State College.
- W. Keith Weeber, M.S., City Hall, East Peoria, Ill., District Sanitary Engineer, State Dept. of Public Health

#### *Industrial Hygiene Section*

- Charles L. Campbell, Ph.D., State Health Dept., Des Moines, Iowa, Chemical Engineer, Div. of Industrial Hygiene

Edward E. Dart, M.D., 1451 Francisco St., Berkeley, Calif., Medical Officer, Industrial Hygiene Service, State Dept. of Public Health

Lydia G. Giberson, M.D.C.M., One Madison Ave., New York, N. Y., Industrial Psychiatrist, Metropolitan Life Insurance Co.

Oscar A. Glaeser, B.S., P. O. Box 1930, Salt Lake City, Utah, Safety Engineer, U. S. Smelting, Refining and Mining Co.

Harland S. Herrin, B.A., State Board of Health, Helena, Mont., Chemist, Industrial Hygiene Div.

#### *Food and Nutrition Section*

J. William Appling, Ph.D., Institute of Paper Chemistry, Appleton, Wis., Research Asst. in Microbiology

Ralph L. France, M.S., Massachusetts State College, Amherst, Mass., Asst. Research Professor of Bacteriology

Byron C. Wagner, B.S., General Electric Co., Bldg. 21-C, Bridgeport, Conn., Engineer, Electric Sink-Cabinet Section

K. G. Weckel, Ph.D., Dept. of Dairy Industry, Univ. of Wisconsin, Madison, Wis., Asst. Professor

#### *Maternal and Child Health Section*

Katherine Bain, M.D., U. S. Dept. of Labor, Childrens Bureau, Washington, D. C., Director, Division of Research in Child Development

Horton R. Casparis, M.D., Vanderbilt Hospital, Nashville, Tenn., Consultant, Tennessee State Health Dept.

Ruth A. Zook, B.S., R.N., Court House, Sullivan, Ind., County Public Health Nurse

#### *Public Health Education Section*

M. Ruth Butler, M.A., R.N., 887 Juniper N.E., Atlanta, Ga., Secretary, Health Section and Director of Research, The Social Planning Council

Ola G. Hylton, M.A., University Hospital, Ann Arbor, Mich., Asst. Director, Social Services, Univ. of Michigan Hospital

Alfred E. Kessler, M.S., 90-04 161st St., Jamaica, L. I., N. Y., Director of Health Education, Queensboro Tuberculosis and Health Assn.

Casimir F. Park, M.D., Health Dept., City Hall, Milwaukee, Wis., Venereal Disease Control Officer

#### *Public Health Nursing Section*

Mary Alton, B.S., Bureau of Public Health Nursing, Michigan Dept. of Health, Lansing, Mich., Regional Supervisor

Myrtle B. Argo, R.N., Dental Bldg., State Univ. of Iowa, Iowa City, Iowa, Supervisor,

Dental Health Education, Bureau of Dental Hygiene

Anna S. Brown, R.N., 315 S. Fifth St., Griffin, Ga., Reserve Nurse, West Central Region, State Dept. of Health

Marie C. Buckley, M.S., R.N., 2244 Cleveland Ave., Chicago, Ill., Director of Nurses, Tuberculosis Institute of Chicago and Cook County

Helen M. Lehmann, M.S., 2063 Adelbert Rd., Cleveland, Ohio, Instructor, School of Nursing, Western Reserve Univ.

Mary Jane Mahoney, R.N., 915 Dwyer St., Glendale, Mo., Staff Nurse and Tuberculosis Coördinator, St. Louis County Health Dept.

Jean Greer Roberts, R.N., B.S., Metropolitan Life Insurance Co., 600 Stockton St., San Francisco, Calif., Territorial Supervisor of Nursing

#### *Epidemiology Section*

William W. Frye, M.D., Vanderbilt Hospital, Nashville, Tenn., Instructor in Preventive Medicine and Public Health, Vanderbilt University

Keith P. Russell, M.D., Bureau of Health, City Hall, Portland, Ore., Director, Div. of Communicable Diseases

William Wolarsky, M.D., M.S.P.H., 50 West 182nd St., Bronx, N. Y., Student, DeLamar Institute of Public Health, Columbia Univ.

#### *Unaffiliated*

Steve Remias, B.S., 536 Walnut St., Ann Arbor, Mich., Student, Div. of Hygiene and Public Health, Univ. of Mich.

Joseph H. Smythe, M.D., Ukiah, Calif., Physician, U. S. Indian Service

#### DECEASED MEMBERS

Charles V. Chapin, M.D., Providence, R. I., Elected Member 1886, Elected Honorary Fellow 1922

George B. Gascoigne, Cleveland, Ohio, Elected Member 1919, Elected Fellow 1922, Elected Life Member 1929

William G. Kirschbaum, New Bedford, Mass., Elected Member 1915, Elected Fellow 1922

W. L. Stevenson, Harrisburg, Pa., Elected Member 1912, Elected Fellow 1922

Antonio Bolduc, M.D., Montreal, Quebec, Canada, Elected Member 1931

Albert B. McCreary, M.D., Jacksonville, Fla., Elected Member 1936

G. L. Ruehle, Silver Spring, Md., Elected Member 1914

George E. Vincent, Ph.D., Greenwich, Conn., Elected Member 1923

## EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

### POSITIONS AVAILABLE

The American Public Health Association has been requested to prepare a reservoir of the names of persons eligible for appointment as physicians with experience or special interest in public health work, as industrial hygienists, as engineers, and as laboratory technicians. Persons with training and experience in these fields are invited to register with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

Physician with public health training to serve as full-time county health officer in rural South Atlantic area. Salary \$3,600 to \$4,000. Write Box C, Employment Service, A.P.H.A.

Bacteriologist—Alexandria, Va., City Department of Health. Milk, water, serological and general examinations. Salary \$1,200 to \$1,800 according to training and experience. Apply to W. A. Browne, M.D., Health Officer.

Public Health Nurse—general nurse for Alexandria, Va., City Health Department. Must be a graduate of an accredited hospital, with special training and experience in public health. Salary \$1,620 to \$1,800 according to qualifications. Apply to W. A. Browne, M.D., Health Officer.

The Arlington County Health Department in Arlington, Va., announces a vacancy for a male bacteriologist technician, salary \$1,900 per annum, which may be increased for satisfactory service. Applicants should apply to R. G. Beachley, M.D., Director of Health and Welfare.

Director of County Health Unit, large southern metropolitan area over 200,000, duties to include the direction of complete

generalized program. Applicant must have M.D., M.P.H., with satisfactory experience in administration and technical phase of public health work. Salary dependent upon experience and training. Opportunity for advancement assured. Box W, A.P.H.A.

### U. S. CIVIL SERVICE COMMISSION

The Commission has announced that applications will be received for positions as Senior Medical Officer (\$4,600), Medical Officer (\$3,800), and Associate Medical Officer (\$3,200), for appointments in the Public Health Service, the Food and Drug Administration, Veteran's Administration, and the Indian Service. Forms for application may be obtained from the U. S. Civil Service Commission, Washington, D. C.

The Commission also announces that applications may be filed for the positions of Public Health Nurse (\$2,000) and Graduate Nurse, general staff duty (\$1,800) in the Indian Field Service, including Alaska. Forms may be obtained from the U. S. Civil Service Commission, Washington, D. C.

### POSITIONS WANTED

#### ADMINISTRATIVE

A woman physician with rather unusual qualifications in maternal and child health, state and local experience, now completing courses for M.P.H. Especially interested in local health administration. A-376

Physician, aged 39, excellent graduate training and experience in public health, specialized in tuberculosis and epidemiology, now employed, will consider position with salary of \$4,500 or better. A-473

Experienced physician, graduate University of Illinois: M.P.H., Johns Hopkins, 1940; seeks administrative opening suitable to his proven ability. Excellent references. A-466

Physician, M.P.H., Harvard; well experienced in city and rural health administration, will consider appointment as district health officer or in city or state health department. A-418

Physician, aged 38, M.P.H., Harvard, 1932; experienced as director of county units and in state department of health; will consider administrative position. A-474

Physician, graduate University of Iowa, candidate for Dr.P.H. at Harvard, seeks good administrative position. A-476

Physician, M.D., Yale; M.S.P.H., Columbia; also short course for health officers, Vanderbilt; good clinical back-

ground; 3 years' public health experience; will consider appointment in child health, epidemiology or public health administration. A-350

Experienced physician with A.B. and M.D. from University of Pennsylvania; candidate for M.P.H. from Yale, desires full-time position as health officer. Will consider going abroad with relief expedition to Europe or Asia. A-477

Physician, M.D., graduate Vienna, residing New York, specializes in the production of motion pictures on health and welfare problems in collaboration with agencies. Scriptwriting, directing, film editing; also 16 mm. camera work; consultation on general production problems, scripts, budgets. A-478

Physician, specialist in maternal and child health. M.D. University of Kansas, M.P.H. Harvard. Excellent background in pediatric residencies, experience in municipal and county health and as Director of maternal and child health in State Health Departments. Desires position as Director of a state program, as pediatrician, or in school or college health program. A-479

#### HEALTH EDUCATION

Young woman, Ph.D., Columbia University; splendid background of experience in health education, will consider position as director of public health education. H-294

Well qualified woman physician, M.A. and M.D. from Stanford; with 6 years' experience in nationally known secondary school in health education and medical advisory duties, wishes position in college health work. H-448

Health educator, with excellent background of teaching experience in schools; M.S.P.H., University of Michigan; wishes position where skill with educational

sound film projection and other recognized technics will be appreciated. H-405

Public health nurse; M.A., Columbia, experienced in teaching health education and public health nursing; wishes teaching position in college or university, summer of 1941. H-472

#### LABORATORY

Teaching, executive, or administrative position desired by experienced teacher in bacteriology and public health; Ph.D., Cornell; now professor in grade A medical school. L-327

Experienced woman bacteriologist, Ph.D., University of Illinois, 1937, wishes position in teaching or research. Excellent bibliography and references. L-410

Experienced bacteriologist, young man of 33, Sc.B., who for several years has been in charge of state laboratory doing public health and diagnostic bacteriology, immunology and serology, will consider opening. L-427

#### SANITARY ENGINEERING

Engineer, aged 38, 3 years' experience as district sanitarian supervisor, state department of health, together with work on plumbing, heating and ventilation, will consider position in the plumbing and heating field or state department of health. Prefers middle western or western states. E-453

Public health engineer, B.S., in Sanitary Engineering from Massachusetts Institute of Technology, experienced in Massachusetts, Connecticut, and Kentucky, seeks position as sanitary or public health engineer with health department. E-380

Engineer with good training and experience in water treatment, sewage plant operation and in research, wishes position as superintendent. Can go anywhere. E-422

#### Advertisement

## Situations Wanted

**PUBLIC HEALTH PHYSICIAN**—B.S., M.D., degrees state university; M.S.P.H., University of Michigan; several years' successful general practice, including part-time health appointment; 4 years' administrative experience with state department of health; for further information write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

**PUBLIC HEALTH PHYSICIAN**—Young physician is available for public health appointment; B.S., M.D., M.P.H. (cum laude) degrees; several years, rural health officer; 2 years, field epidemiologist; now completing graduate training in tuberculosis work; for further information write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

**PUBLIC HEALTH NURSE**—B.S. degree in Public Health Nursing, Columbia University; graduate of one of country's outstanding hospitals; experience includes several years as infant welfare

nurse and 6 years as educational supervisor in outpatient department of large teaching hospital; past several years, instructor of public health nursing, large teaching hospital; for further information write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

**PUBLIC HEALTH NURSE**—Fairly recent graduate of midwestern training school; certified public health nurse; will receive special teacher's certificate upon completion present courses in university medical school; for further information write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

**BACTERIOLOGIST**—A.B., Ph.D., state university; 6 years, university laboratory of animal pathology; 4 years, parasitologist, state department public health; for further information write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

## Advertisement

# Opportunities Available

**BACTERIOLOGISTS**—(a) Research assistant for survey on prevalence of murine typhus and leptospirosis in Hawaii; basic training and research experience in bacteriology required; training in parasitology desirable; \$187, plus traveling expenses to Honolulu. (b) State department of health; \$1,900, early increase; Southeast. PH3-1, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH PHYSICIANS**—(a) Young physician, well trained in venereal work; municipal health department; Southeast. (b) Obstetrical consultant for State Division of Maternal Hygiene; 3 years' obstetrical training required; advantageous if experienced or trained also in public health work; South. (c) Pediatrician interested in public health work; interesting appointment; state health department. (d) Health officer; Master's degree in public health required; \$4,200, plus travel allowance of about \$650. (e) Several young physicians trained in public health work for rural health service in Southwest. PH3-2, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**WANTED**—(a) Young physician for 2 year fellowship in student health; stipend for second year \$2,250; eastern university. (b) Young unmarried physician; interesting industrial appointment; South

America; \$300. PH3-3, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSING EXECUTIVES**—(a) Public health nursing supervisor; responsibility covers generalized program including school and delivery service; degree desirable, but not essential; \$175, plus travel allowance. (b) Educational director and consultant in division maternal and child health; \$200, plus travel allowance; West. (c) Public health nurse for important teaching position on faculty of large teaching hospital; public health program in outpatient clinic recently initiated; good organizer required; East. (d) Supervisor outpatient department and central dressing room; large eastern hospital; certificate in public health nursing required. PH3-4, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSES**—(a) State public health nursing division; primarily rural work; \$1,800, plus \$600 traveling expenses; Southwest. (b) Municipal department of health; must be certified public health nurse in Illinois; \$125, early increase. (c) School nurse; must be qualified to teach public health nursing; small town; Midwest. PH3-5, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

## NURSE PLACEMENT SERVICE

Anna L. Tittman, R.N., Executive Director

Suite 512, Willoughby Tower, Michigan and Madison Avenues, Chicago, Ill.

*Professionally sponsored. Approved Bureau of N.O.P.H.N. Non Profit No registration fee.*

**ADMINISTRATION**—(a) Director P.H.N.; State department of health; West; \$2,400. No. 41-0053. (b) Assistant Director P.H.N.; State department of health; Midwest; college degree, certificate in P.H.N.; supervisory and administrative experience; \$3,000. No. 40-3185. (c) Director; new visiting nurse service being organized; midwest city of 10,000. No. 41-0214.

**EDUCATION**—(a) Instructor in P.H.N.; midwestern city health department; initial salary \$2,100. No. 40-3278. (b) Assistant professor of P.H.N. and director of program of study; private university; \$3,000. No. 40-3128. (c) Educational Director and Assistant to Executive Director; V.N.A.; midwestern; \$2,400. No. 40-1504. (d) Director of Health Education Activities; Department for Prevention of disease in large children's hospital; supervise health clubs, assemble health education exhibits, supervise methods of health education as practised by field nurses; university study and experience in health education; salary open. No. 41-0242.

**CONSULTATION**—(a) Maternity; private urban agency; P.H.N. certificate, generalized supervisory experience, special maternity preparation; \$2,100. No. 40-2521. (b) Orthopedic; city health department; western; salary open. No. 40-2703.

**SUPERVISORY**—(a) Generalized; official; 16 nurses on staff; P.H.N. certificate, 2 years' supervisory experience; southern city; \$2,100. No. 41-0156. (b) Generalized; V.N.A.; P.H.N. certificate, college degree, supervised experience; East; \$2,100. No. 41-0313. (c) Rural county and District Supervisors; New England; No. 40-2319. Similar positions all sections. Salary range \$1,800-\$2,100.

**ONE NURSE SERVICE**—(a) County nurse; western mountain states; P.H.N. certificate, staff experience; Nos. 06338, 40-2820, 09011. (b) County; Southwest; No. 41-0265. Similar positions all sections; salaries vary. (c) Community nurse; private; New England; Nos. 40-2953, 41-0303. (d) Community; private; V.N.A. experience; west coast; \$1,800. No. 40-3279.

**STAFF**—(a) Generalized; V.N.A.; P.H.N. certificate, experience in tuberculosis; mid-Atlantic; \$1,500. No. 41-0213. (b) V.N.A.; New England; \$1,380. No. 40-2733. (c) V.N.A.; Southwest; initial salary \$110. No. 40-2359. (d) Orthopedic; private, urban agencies; open all sections; one year course in Physical Therapy; \$130-\$150 a month.



# NEWS FROM THE FIELD

## APPRAISAL FORM FOR LOCAL TUBERCULOSIS ACTIVITIES

A THIRD, revised edition of the *Appraisal Form for local Tuberculosis Activities* has been issued under the authorship of Carl E. Buck, Dr. P.H., Field Director of the American Public Health Association. This report, which is prepared for and printed by the National Tuberculosis Association, 1790 Broadway, New York, has been reviewed and approved by the A.P.H.A. Subcommittee on Appraisal of Local Health Work, W. F. Walker, Dr.P.H., *Chairman*.

A limited supply of single copies is available from the A.P.H.A. office.

## SOUTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION ELECTS OFFICERS

AT its meeting held on February 18, in Los Angeles, Calif., the Southern California Public Health Association elected the following officers, to serve for the current year:

*President*—Theodore D. Beckwith, Ph.D., Los Angeles

*President-elect*—Roy O. Gilbert, M.D., East Los Angeles

*First Vice-President*—A. Victor Nasatir, M.D., Los Angeles

*Second Vice-President*—Charles W. Arthur, Ph.B., Pasadena

*Secretary-Treasurer*—Eunice Lamona, R.N., Los Angeles

*Assistant Secretary-Treasurer*—Floyd P. Wilcox, D.V.M., Los Angeles

## "EAT THE RIGHT FOOD"

IT has been announced, by Harriet Elliott, Consumer Commissioner of the National Defense Advisory Commission, Washington, D. C., that, as part of the plans of the Commission for improving nutrition, copies of a folder entitled "Eat the Right Food" are available in quantity from the office of the Commission in the Federal Reserve Building, Washington.

## HARVARD-RED CROSS HOSPITAL FOR ENGLAND

THE American Red Cross is sending to England a Unit for the study of communicable diseases in wartime conditions. Dr. John E. Gordon, Professor of Preventive Medicine and Epidemiology at the Harvard Medical School, is now in England completing arrangements with British health authorities for the establishment of a portable hospital of 120 beds which Harvard University and the American Red Cross are sending for a location in southwest England.

Also on the staff are Dr. Paul B. Beeson, Boston, Dr. Gerald F. Houser, Boston, Dr. Dean S. Fleming, epidemiologist, Minneapolis, Dr. William L. Hawley, Boston, Dr. Thomas F. McNair Scott of the University of Pennsylvania, and Dr. Alex J. Steigman, Philadelphia. A staff of fifty Red Cross nurses is being selected for the hospital.

## UNIVERSITY OF MINNESOTA TO GRANT MASTER OF PUBLIC HEALTH DEGREE

THE Regents of the University of Minnesota have voted to offer a degree of Master of Public Health in place of the Certificate of Public Health which was previously granted.

The course of study leading to the new degree will be offered through the Medical School and registration will be limited to students who have previously obtained a professional degree. This will include graduate physicians, dentists, veterinarians, engineers, and suitably qualified public health nurses already in possession of a Bachelor's degree. The change will become effective with the current academic year.

Gaylord W. Anderson, M.D., is Professor and Head of the Department of Preventive Medicine and Public Health under which the courses will be offered.

## TUBERCULOSIS IN DRAFTEES

THE New York State Department of Health has reported to the Committee on Tuberculosis and Public Health of the State Charities Aid Association of New York regarding the plan set up with the coöperation and approval of U. S. Army authorities to x-ray the chests of men reporting at up-state induction centers under the Selective Service Act. Facilities have been in operation at the stations in Buffalo, Rochester, Syracuse, and Albany, and examination of the first 1,400 men called resulted in the discovery of 19 new cases of tuberculosis. This, in the opinion of Dr. Robert Plunkett, more than justified the time, money, and effort expended in setting up the plan.

TRANSCRIPTION OF RADIO TALK  
ON EYESIGHT

THE National Society for the Prevention of Blindness is offering, free of charge and express prepaid, an electrical transcription of a 14 minute radio talk on the subject, "Protection of Eyesight and National Defense." The speaker is Mason H. Bigelow, president of the organization.

Requests for the disc should be addressed to: David Resnick, Director of Publicity, National Society for the Prevention of Blindness, 1790 Broadway, New York, N. Y.

NATIONAL STUDENT HEALTH  
ASSOCIATION MEETING

THE Third Annual Meeting of the National Student Health Association, a recently formed organization of college health workers in Negro institutions in the United States, will be held in New Orleans, La., April 11 and 12, under the auspices of Flint-Goodridge Hospital.

Paul B. Cornely, M.D., is the Executive Director of the Association at Howard University, Washington, D. C.

THE FAMILY PHYSICIAN IN VENEREAL  
DISEASE CONTROL

THE Bureau of Social Hygiene of the New York City Department of Health, in coöperation with the New York State Department of Health and the U. S. Public Health Service, has announced a new series of Saturday morning meetings for physicians in practice, beginning March 1, for ten consecutive Saturdays. The general theme is "The Rôle of the Family Physician in Venereal Disease Control."

The topics for the first five sessions have been announced as follows: "The Patient with Genital Lesions," "The Patient with Early Syphilis," "The Patient with Visceral Syphilis," "The Male Patient with Gonorrhea," "The Female Patient with Gonorrhea."

The sessions begin at 10:30 A.M., at 125 Worth Street, New York, N. Y. No. registration is required.

## MICHIGAN APPRAISALS

OF the 83 counties in Michigan, 63 have full-time county or district health departments. All county and district health departments in the state are to be appraised for the year 1940. Dr. B. W. Carey and Miriam Cummings, of the Children's Fund of Michigan, will appraise the 9 units in the Upper Peninsula. Dr. E. V. Thiehoff, Assistant Director of the Bureau of Local Health Services of the Michigan Department of Health, recently started an appraisal of all of the units in the Lower Peninsula except the 7 counties which are supported by the W. K. Kellogg Foundation. In these counties the Kellogg Foundation will conduct their own appraisal.

It is expected that all appraisals will be completed by May, 1941. This is the first time in the history of Michigan that every full-time rural health department will have been appraised in a single year.

## NEW ENGLAND HEALTH INSTITUTE

**T**HE Eleventh New England Health Institute, under the sponsorship of the Health Departments of each New England state, will be held in Boston, Mass., April 2-4, with headquarters at the Hotel Statler. The general theme of the Institute is "Public Health in National Defense."

Other collaborating agencies include the U. S. Public Health Service, the Children's Bureau, the U. S. Department of Labor, the New England Tuberculosis Association, Massachusetts Public Health Association and the Massachusetts Central Health Council. The three day Institute is divided into sixteen sections.

Further information may be obtained from the respective State Departments of Health.

## RESEARCH GRANTS FOR POLIOMYELITIS STUDIES

**T**HE National Foundation for Infantile Paralysis, 120 Broadway, New York, N. Y., announces that the semi-annual meeting of its Medical Committees will be held May 15, 1941, at which time applications for grants for the study of the cause, prevention, and treatment of infantile paralysis will be considered. Applications for grants must be received at the office of the Foundation on or before March 15.

## VERMONT CHILD HEALTH CONFERENCE

**A** STATE-WIDE meeting on "Health for Children in Vermont," sponsored by the Advisory Committee of the Health Department's Maternal and Child Health Division, was held February 11 in Montpelier, Vt., and drew a record attendance from 82 towns, from every county. Vermont health was the theme of the morning sessions, but at the afternoon and evening sessions speakers considered national health for today and tomorrow.

Mrs. A. M. Gay served as Chairman.

## UNIVERSITY OF MICHIGAN NEW SCHOOL OF PUBLIC HEALTH

**T**HE Michigan University Record has announced that under authority from the Board of Regents the teaching of hygiene, public health and preventive medicine has been reorganized and an independent unit at the University has been established.

The Rockefeller Foundation of New York and the W. K. Kellogg Foundation of Battle Creek have each contributed \$500,000 for the establishment of the new School of Public Health. The expenditures for site, building, and equipment are not to exceed one-half the total, and the remainder of the grant is available for the expenses of operation over a ten year period. An announcement is to be made later regarding the plan of organization.

## HERMANN M. BIGGS LECTURE ON PUBLIC HEALTH

**T**HE Committee on Public Health Relations of the New York Academy of Medicine has announced the annual lecture in memory of Hermann M. Biggs, to be given Thursday evening, April 3, at the Academy of Medicine, 2 East 103rd Street, New York, N. Y. Dr. Clarence A. Mills, Professor of Experimental Medicine, University of Cincinnati College of Medicine, will be the speaker, and his subject will be "The Relation of Climate and Geography to Health." The lecture is open to the public.

## CUTTER LECTURE AT HARVARD UNIVERSITY

**T**HE annual Cutter Lecture on Preventive Medicine, to be given at the Harvard Medical School, Boston, Mass., on March 7, will be: "Intracellular Infection and Some of Its Possible Implications," by Dr. Ernest W. Goodpasture, Professor of Pathology of the Vanderbilt University School of Medicine, Nashville, Tenn.

## PERSONALS

## Central States

GEORGE W. BASSOW, M.D.,† Health Commissioner of Jefferson County, Steubenville, Ohio, announces that the County Health Department is now on a full-time basis.

DR. BERTHA B. BRAINARD, of Jamestown, N. D., was recently appointed in charge of the Student Health Service at Oregon State College, Corvallis.

DR. JAMES C. ELDER, of Millersburg, Ohio, has resigned as Health Officer of Holmes County.

PAUL HANSEN,\* of Greeley & Hansen, Engineers, in Chicago, Ill., has been appointed to handle matters of public health for the Illinois Emergency Defense Council. The local council will coördinate matters of defense with the National Defense Council.

ROBERT B. HARKNESS, M.D.,† Director of the Barry County Health Department, Hastings, Mich., has been appointed Assistant Field Director of the W. K. Kellogg Foundation, a newly created position. He will assist MATTHEW R. KINDE, M.D.,† of Battle Creek, Field Director, in administering the educational activities and services in the 7 counties which make up the Foundation's health project. Dr. Harkness will take up his new work in May.

FRANK J. HILL, M.D., M.P.H.,† Director of the Mason-Manistee-Benzie Health Department, Manistee, Mich., has been appointed Director of the Bureau of Preventable Diseases in the State Department of Health.

N. PAUL HUDSON, M.D.,\* Professor of Bacteriology and Chairman of the Department of Bacteriology of the College of Medicine, Ohio State University, Columbus, is now in London, supervising the distribution of the influenza vaccine under the auspices of the Rockefeller Foundation.

JOHN L. LAVAN, M.D.,\* of Grand Rapids, Mich., who was Health Commissioner of Toledo for 4 years before going to Michigan, has returned to Toledo to become director of a new public health district. Dr. Lavan left Toledo to be Health Officer of Kalamazoo, Mich., in 1932 and went to Grand Rapids as City Health Officer in 1935. In 1939, Dr. Lavan was made Secretary of the newly reorganized Advisory Council to the State Department of Health.

DR. ZODA D. LUMKLEY, of Wood River, Ill., has been named Health Officer of Roxana, to succeed the late DR. CHRISTIAN H. DIEHL.

HERMAN M. SOLOWAY, M.D.,† of Chicago, Ill., has been appointed head of the newly created Division of Social Hygiene in the Illinois State Department of Public Health, the principal function of which will be to control the venereal diseases with especial emphasis on the eradication of syphilis.

DR. HUGH M. SWANEY, of Goodland, Kans., has been named Health Officer of Sherman County.

CHARLES P. TAFT, of Cincinnati, Ohio, has been appointed as Assistant Coördinator of all health, welfare, nutrition, and recreation activities affecting national defense. Mr. Taft is the son of the late President William Howard Taft and a brother of Senator Robert A. Taft.

## Eastern States

WALTER H. EDDY, PH.D.,\* since 1919 Professor of Physiological Chemistry at Columbia University, New York, N. Y., and since 1927 Director of a Bureau of Foods for *Good Housekeeping* Magazine, has resigned from the Bureau to become head of the Eddy Laboratories, 409 East 47th Street, New York, specializing in consultation and research.

ANDREW O. LAAKSO, M.D., has been

\* Fellow A.P.H.A.

† Member A.P.H.A.

appointed Health Officer of Killingly, Conn., succeeding GEORGE S. LAMBERT, M.D.

HERBERT B. LARNER, of New York, N. Y., has been reëlected President of the Board of Health of the Borough of Glen Ridge, N. J., for the current year.

MARTIN L. O'NEILL, M.D., of Jewett City, has been appointed Health Officer of Voluntown, Conn., succeeding JOHN H. McLAUGHLIN, M.D., of Jewett City.

OSCAR ROGOL, M.D., has been appointed Health Officer of Oxford, Conn.

JOHN S. STANESLOW, M.D., has been appointed Health Officer of Prospect, Conn.

CLARENCE G. THOMPSON, M.D.,† of Norwich, Conn., has been appointed Health Officer of Ledyard.

#### Southern States

RALPH H. ALLEN, M.D.,† formerly of Ruston, La., has been placed in charge of the health activities in Henry County.

CARROLL T. BOWEN, M.D., of Jacksonville, Fla., Director of Venereal Disease Control for the Duval County Health Unit, has been appointed Director of the Broward County Health Unit, with headquarters in Fort Lauderdale.

JAMES M. CAMPBELL, M.D., of Morton, Miss., has been appointed Health Officer of Marion County.

WILLIAM B. FARRIS, M.D.,† of Tazewell, Tenn., has been appointed Health Officer of Williamson County, to succeed ROSCOE FAULKNER, M.D.

WALTER BROWNLEY FOSTER, M.D.,\* head of the Richmond, Va., Department of Public Welfare for 16 years, has been appointed to the staff of the State Department of Health.

JOSEPH HIRSCH,† of Washington, D. C., has resigned his position as Assistant Health Education Specialist with the U. S. Public Health Service, and is now serving as Associate Health Education Specialist with the U. S. Office of Education.

RUTHERFORD O. INGHAM, M.D.,† of Livingston, Ala., formerly Health Officer of Bibb County, has been assigned to a similar position in Limestone County.

DR. ROY L. JOHNSON, of Douglas, Ga., has resigned as Health Commissioner in Coffee County, to enter private practice.

HAROLD M. KELSO, M.D.,† has been named to succeed JOHN C. NEALE, JR., M.D.,† as Director of the Southwest District Health Unit, at Abingdon, Va.

ALLEN W. LANE, M.D., of Lawrenceville, Va., has been appointed Health Officer of Pulaski County, to succeed HAROLD M. KELSO, M.D.†

THOMAS F. MCGOUGH, JR., M.D., recently Assistant Health Officer of Pulaski County, in Pulaski, Va., has been transferred to Northampton County, with headquarters in Eastville, to replace WILLIAM Y. GARRETT, M.D.,† who will take a course at the Johns Hopkins School of Hygiene and Public Health, Baltimore, Md.

JOHN C. NEALE, JR., M.D.,† of Abingdon, Va., has been appointed in charge of the new health district consisting of Isle of Wight, Nansemond, Norfolk, and Princess Anne Counties which has been established in Virginia, with headquarters in Norfolk.

CHARLES W. PEASE, M.D., formerly Health Officer of Hendry County, Fla., was recently transferred to Jacksonville.

WARREN C. RAMER, M.D., of Trenton, Tenn., has been appointed head of the Henderson-Decatur County Health Unit, to succeed JAMES C.

\* Fellow A.P.H.A.  
† Member A.P.H.A.

ARMSTRONG, M.D., now of Jefferson City, resigned.

WILLIAM H. SEBRELL, JR., M.D.,\* of the National Institute of Health, Washington, D. C., has been appointed Director of the newly established Division of Chemotherapy in the Institute. The new unit will have quarters in Bethesda, Md., in a laboratory building now being equipped, which will also be the headquarters of the Divisions of Chemistry and Zoölogy.

HUGH F. STANTON, M.D., of St. Genevieve, Mo., has been appointed Director of the Central Idaho Health Unit, to succeed MAX B. McQUEEN, M.D., who has been called to active duty with the U. S. Army.

BERTHA E. STOKES, M.D., of Union Springs, Ala., has been appointed Health Officer of Bullock County, with headquarters in Union Springs; she succeeds DELMER F. PARKER, M.D., who resigned to enter the Indian Service of the U. S. Department of the Interior.

ROBERT W. TODD, M.D., DR.P.H.,† of New Orleans, has been appointed Health Officer of Russell County, Ala., succeeding MARION L. SHADDIX, M.D., of Phenix City, who recently was transferred to Clay County.

ARTHUR P. VANDERGRIFF, JR., M.D., formerly of Jackson, Miss., has been named Director of the DeSoto County Health Unit, succeeding JOHN W. EVANS, JR., M.D., of Hernando; the latter left for postgraduate work at Washington University School of Medicine, St. Louis, Mo.

ABEL WOLMAN, DR.ENG.,\* Professor of Sanitary Engineering at Johns Hopkins University, and Chairman of the National Water Resources Committee, has been appointed by Secretary of War Henry L. Stimson to a committee of 7 which will study national defense problems pertaining to air raid shelters, water supply, power, etc.

### Western States

CHARLES E. SCHOFF, M.D., of Sacramento, Calif., has resigned as a member of the State Board of Health, due to ill health.

### Foreign

CHARLES A. BAILEY, M.D., M.P.H.,† who recently retired from the staff of the International Health Division, Rockefeller Foundation in the Mexico City Office, has become Acting Director of the Yazoo County Health Department, Yazoo City, Miss., replacing HUGH L. MCCALIP, M.D.,† the Director, who is on service with the U. S. Army.

GERTRUDE HODGMAN, recently Dean of the School of Nursing, Peiping Union Medical College Hospital, Peiping, China, has been appointed Director of the Russell Sage College School of Nursing, Saratoga Springs, N. Y. Miss Hodgman, who is a graduate of the Johns Hopkins Hospital School of Nursing, was formerly Educational Secretary of the National Organization of Public Health Nursing and a member of the staff of the Henry Street Visiting Nurse Service, of New York, N. Y.

### DEATHS

A. B. MCCREARY, M.D.,† State Health Officer of Florida, died at Jacksonville on January 24, at the age of 45.

WILLIAM WEBBER FORD, M.D., D.P.H., Professor-Emeritus of Bacteriology in Johns Hopkins University, died on February 10, in Baltimore, at the age of 69.

CHARLES VALUE CHAPIN, M.D.,\* who retired in 1932 after 48 years as Superintendent of Health of Providence, R. I., died in Providence on January 31.

\* Fellow A.P.H.A.

† Member A.P.H.A.

MARY SWARTZ ROSE, PH.D.,\* Professor of Nutrition at Teachers College, Columbia University, New York, N. Y., died in Edgewater, N. J., on February 1.

\* Fellow A.P.H.A.

† Member A.P.H.A.

CHARLES WARDELL STILES died in Baltimore, Md., on January 24.

GEORGE EDGAR VINCENT, PH.D.,† former president of the Rockefeller Foundation, died in New York, N. Y., February 1.

## CONFERENCES AND DATES

- American Academy of Political and Social Science. Philadelphia, Pa. April 4-5.
- American Association for Social Security. New York, N. Y. March 28-29.
- American Association of Pathologists and Bacteriologists. New York, N. Y. April 10-11.
- American College of Physicians—25th Annual Session. Statler Hotel. Boston, Mass. April 21-25.
- American Library Association. Annual Meeting. Boston, Mass. June 19-25.
- American Medical Association—92nd Annual Meeting. Cleveland, Ohio. June 2-6.
- American Public Health Association—70th Annual Meeting. Convention Hall, Atlantic City, N. J. October 14-17.
- American Society of Civil Engineers—Spring Meeting. Baltimore, Md. April 23-26.
- American Society of Heating and Ventilating Engineers—Summer Meeting. San Francisco, Calif. June 16-20.
- American Society of Planning Officials. National Conference on Planning, in coöperation with American Institute of Planners, American Planning and Civic Association, National Economic and Social Planning Association. Philadelphia, Pa. May 11-14.
- American Water Works Association—61st Annual Convention. Royal York Hotel, Toronto, Ont., Can. June 22-26.
- New York Section—Syracuse, N. Y. March 27-28.
- Indiana Section—Indianapolis, Ind. April 24-25.
- Illinois Section—Lincoln Douglas Hotel, Quincy, Ill. April 28-30.
- Pacific Northwest Section—Olympic Hotel, Seattle, Wash. May 8-10.
- Southeast Section—Charleston, S. C. May 12-14.
- Ohio Section—Cincinnati, Ohio. May 15-16.
- Montana Section—Hotel Florence, Missouli, Mont. May 23-24.
- Michigan Section—Grand Rapids, Mich. September 24-26.
- Southwest Section—Fort Worth, Tex. October 13-16.
- California Section—Fresno, Calif. October 22-25.
- Four States Section—Baltimore, Md. November 6-7.
- Arizona Sewage & Waterworks Association—16th Annual Meeting. Yuma, Ariz. March 21-23.
- Chamber of Commerce of the United States—29th Annual Meeting. Washington, D. C. April 28-May 1.
- Child Welfare League of America—Midwest Regional Conference. Chicago, Ill. April 17-19.
- Civil Service Assembly—Eastern Regional Meeting. Washington, D. C. Third Week in May. Central Regional Meeting, probably May.
- College Health Workers—3rd Annual Meeting. New Orleans, La. April 11-12.
- Colorado Public Health Association. La Junta, Colo. May.
- Conference of State and Territorial Health Officers of North America. Washington, D. C. Tentative date: Week of April 28.
- Florida Public Health Association. Orlando, Fla. December, 1941.
- Food Conference—under the auspices of the Institute of Food Technologists. Pittsburgh, Pa. June 16-18.
- Group Health Federation of America—Third Annual Convention. Los Angeles, Calif. June.
- Heating, Piping & Air Conditioning Contractors National Association. San Francisco, Calif. June 16-20.
- Idaho Public Health Association. Lewiston, Ida. October 6-7.
- Michigan Public Health Association. Grand Rapids, Mich. November 12-14.
- Missouri Public Health Association. St. Louis, Mo. April.
- National Association of Housing Officials. Cincinnati, Ohio. April 16-19.
- National Foundation for Infantile Paralysis—

- Medical Committees. Semi-annual Meeting. Foundation Office, 120 Broadway, New York, N. Y. May 15.
- National Negro Health Week—Year 1941. Objective: Personal Hygiene and First Aid Preparedness. March 30–April 6.
- National Society for Crippled Children—8th Annual Seal Sale. March 21–April 13.
- National Student Health Association—Third Annual Meeting. Flint-Goodridge Hospital, New Orleans, La. April 11–12.
- National Tuberculosis Association. Annual Meeting. Hotel Gunter, San Antonio, Tex. May 5–8.
- New England Conference on Tomorrow's Children—Second. Littauer Center, Harvard University, Cambridge, Mass. July 16–18.
- New England Health Institute—Eleventh. Under the sponsorship of the health departments of each New England state. General Theme: Public Health in National Defense. Hotel Statler, Boston, Mass. April 2–4.
- New Mexico Public Health Association. Gallup, N. M. October.
- Northern Tri-State Medical Association. Tiffin, Ohio. April 8.
- Ohio Federation of Public Health Officials. Columbus, Ohio. May 23.
- Pacific Heating and Air Conditioning Exposition. Exposition Auditorium, Civic Center, San Francisco, Calif. June 16–20.
- Pennsylvania Public Health Association. Wilkes-Barre, Pa. May 28.
- Smoke Prevention Association of America, Inc.—35th Annual Convention. Ansley Hotel, Atlanta, Ga. June 3–6.
- Southern Public Works Congress. Birmingham, Ala. April.
- State Charities Aid Association—State and Local Committees on Tuberculosis and Public Health. Hotel Commodore, New York, N. Y. May 20–21.
- Tennessee Public Health Association. Nashville. Tenn. May.
- Western Branch, American Public Health Association—12th Annual Meeting. San Diego, Calif. May 25–29.

#### Foreign

- International College of Surgeons. Mexico City, Mexico. August 10–13.
- Pan American Medical Association—8th Congress. Buenos Aires, Argentina. 1941.

## Best Sellers in the Book Service for February

Manual of Public Health Nursing. 3d ed. National Organization for Public Health Nursing.....	\$2.50
Military Preventive Medicine. 3d ed. Lieut. Col. G. C. Dunham.	2.50
Manual of Public Health Bacteriology and Chemistry. 2d ed. Department of Public Health, San Francisco.....	1.50
Seventh Institute on Public Health Education. American Public Health Association .....	1.00
Diagnostic Procedures and Reagents. Technics for the Laboratory Diagnosis and Control of the Communicable Diseases. American Public Health Association.....	2.75
Municipal and Rural Sanitation. 2d ed. Victor M. Ehlers and Ernest W. Steel.....	4.00
Preventive Medicine and Hygiene. 6th ed. Milton J. Rosenau	10.00

*Order from the Book Service*

**American Public Health Association**

1790 Broadway

New York, N. Y.



## MEETINGS OF AFFILIATED SOCIETIES and A.P.H.A. Branches

### Society and Secretary

### Next Meeting

ARIZONA PUBLIC HEALTH ASSOCIATION Marion E. Stroud, Room 100, Arizona State Bldg., Phoenix.	Phoenix, April 19-20
COLORADO PUBLIC HEALTH ASSOCIATION Helen Cannon, 3136 York St., Denver, Colo.	La Junta, May 2-3
CONNECTICUT PUBLIC HEALTH ASSOCIATION Mario L. Palmieri, M.D., 43 S. Main St., Middletown	Bridgeport, April 16
CUBAN PUBLIC HEALTH SOCIETY Dr. Carlos Pinciro, Instituto Finlay, Havana, Cuba.	To be announced
FLORIDA PUBLIC HEALTH ASSOCIATION Edward M. L'Engle, M.D., State Board of Health, Jacksonville.	Orlando, December
GEORGIA PUBLIC HEALTH ASSOCIATION Louva G. Lenert, 245 State Office Building, Atlanta.	Atlanta, May 29-31
IDAHO PUBLIC HEALTH ASSOCIATION Herbert C. Clare, State Division of Public Health, Boise	Lewiston, October 6-7
IOWA PUBLIC HEALTH ASSOCIATION Carl F. Jordan, M.D., State Department of Health, Des Moines, Ia.	Des Moines, May
MASSACHUSETTS PUBLIC HEALTH ASSOCIATION G. Donald Buckner, 69 Coolidge Avenue, Needham.	To be announced
MICHIGAN PUBLIC HEALTH ASSOCIATION Marjorie Delavan, State Department of Health, Lansing.	Grand Rapids, November 12-14
MISSOURI PUBLIC HEALTH ASSOCIATION Glen J. Hopkins, 204 N. Boonville Rd., Jefferson City.	St. Louis, May 15-17
NEW MEXICO PUBLIC HEALTH ASSOCIATION Frank W. Parker, Jr., M.D., P. O. Box 1086, Santa Fe, N. M.	Gallup, October
NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION Margaret Blee, Instructor in Nursing Education, University of California, Berkeley, Calif.	To be announced
OHIO FEDERATION OF PUBLIC HEALTH OFFICIALS W. D. Bishop, M.D., Darke County Health Unit, Greenville.	Columbus, May 23
PENNSYLVANIA PUBLIC HEALTH ASSOCIATION C. E. Houston, Department of Public Health, Washington, Pa.	Wilkes-Barre, May 28
PUBLIC HEALTH ASSOCIATION OF NEW YORK CITY Frank Kiernan, 386 Fourth Avenue, New York.	To be announced
SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION Ruth George, State Board of Health, Columbia.	Myrtle Beach, May
SOUTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION Eunice Lamona, R.N., 6028 Harcourt Ave., Los Angeles.	To be announced
TENNESSEE PUBLIC HEALTH ASSOCIATION Dr. Robert H. Hutcheson, State Department of Health, Nashville.	Nashville, May
TEXAS PUBLIC HEALTH ASSOCIATION Alan C. Love, 303 West 15 Street, Austin.	To be announced
UTAH PUBLIC HEALTH ASSOCIATION S. E. Gilchrist, 105 South State St., Salt Lake City, Utah.	To be announced
WEST VIRGINIA PUBLIC HEALTH ASSOCIATION Dorothea Campbell, State Department of Health, Charleston.	To be announced
SOUTHERN BRANCH, A.P.H.A. P. E. Blackerby, M.D., 559 Sunnyside Drive, Louisville, Ky.	To be announced
WESTERN BRANCH, A.P.H.A. W. Ford Higby, 45 Second Street, San Francisco, Calif.	San Diego, Calif., May 26-30, 1941

## Request for Application for Membership

I wish to apply for membership in the American Public Health Association. Please send me an application blank.

Name.....

Print name in full and give degree

Street and City..... State.....

For correspondence and the Journal

Present public health occupation.....

**REQUIREMENTS.** Persons professionally engaged or interested in public health work are eligible for election as Members of the Association.

**DUES:** Dues of Members are \$5.00 per year, which includes an annual subscription to the AMERICAN JOURNAL OF PUBLIC HEALTH. Persons joining the Association after July 1 are requested to pay \$7.50, covering a year and one half from July, 1941, to December, 1942.

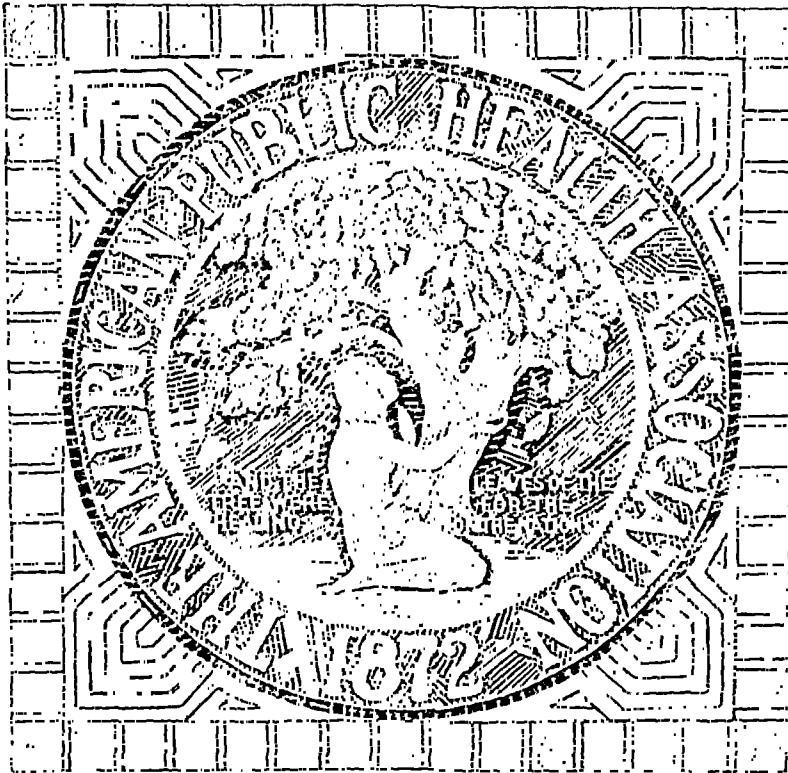
**AMERICAN PUBLIC HEALTH ASSOCIATION**  
1790 BROADWAY AT 58TH STREET, NEW YORK, N. Y.

SUPPLEMENT TO AMERICAN JOURNAL OF PUBLIC HEALTH  
VOL. 31, No. 3, MARCH, 1941

*Eleventh Annual Year Book*

# AMERICAN PUBLIC HEALTH ASSOCIATION

1940-1941



AMERICAN PUBLIC HEALTH ASSOCIATION  
1790 BROADWAY, NEW YORK, N. Y.

Copyright, 1941  
AMERICAN PUBLIC HEALTH ASSOCIATION

# CONTENTS

	PAGE
Governing Council, American Public Health Association . . . . .	7
Constitution and By-Laws, American Public Health Association . . . . .	9
Annual Meetings . . . . .	16
Presidents of the American Public Health Association . . . . .	17
Recognition for Extended Membership . . . . .	18
Recipients of the Sedgwick Memorial Medal . . . . .	18
Executive Staff . . . . .	19
American Journal of Public Health: Editorial Board . . . . .	19
Publications . . . . .	19
Section Councils . . . . .	20
Committee List, 1940-1941 . . . . .	22
Representatives of the American Public Health Association to Other Organizations and Committees for 1941 . . . . .	39
Resolutions Adopted by the Association October 10, 1940 . . . . .	40
Desirable Minimum Functions and Organization Principles for Health Activities . .	43
STANDING COMMITTEES:	
Administrative Practice . . . . ., . . . . .	52
E. L. Bishop, M.D., <i>Chairman</i>	
Eligibility . . . . .	56
Don W. Gudakunst, M.D., <i>Chairman</i>	
Research and Standards . . . . .	57
Kenneth F. Maxcy, M.D., <i>Chairman</i>	
Professional Education.	
A report on the work of the Committee during the year 1940 appeared in the December, 1940, <i>Journal</i> .	
ASSOCIATION COMMITTEE:	
American Museum of Hygiene . . . . .	60
Louis I. Dublin, Ph.D., <i>Chairman</i>	
COMMITTEE ON RESEARCH AND STANDARDS:	
Subcommittee on the Hygiene of Housing . . . . .	61
C.-E. A. Winslow, Dr.P.H., <i>Chairman</i>	
REPORTS OF SECTION COMMITTEES	
ENGINEERING SECTION:	
Coördination of Public Health Engineering Activities (Functions of Public Health Engineering Personnel) . . . . .	63
Roy J. Morton, <i>Chairman</i>	
Municipal Public Health Engineering . . . . .	68
Sol Pincus, C.E., <i>Chairman</i>	
Shellfish . . . . .	72
L. M. Fisher, C.E., D.P.H., <i>Chairman</i>	
Water Supply (Results of a Survey of Water Supply Control Practices) . . . .	75
Anselmo F. Dappert, <i>Chairman</i>	
Waterways Pollution (Standards of Water Purity) . . . . .	83
Carl E. Green, C.E. in S.E., <i>Chairman</i>	
FOOD AND NUTRITION SECTION:	
Analyzing Frozen Desserts . . . . .	94
F. W. Fabian, Ph.D., <i>Chairman</i>	
Assay of Foods (Vitamin B Complex—The Members of This Group and Status of Methods of Assay) . . . . .	95
Henry T. Scott, Ph.D., <i>Chairman</i>	

	PAGE
Foods (Except Milk). (Need for Sanitary and Other Standards for the Manufacture and Sale of Fruit and Vegetable Juices) . . . . .	101
Donald K. Tressler, Ph.D., <i>Chairman</i>	
Subcommittee on Dishwashing (Food Utensil Sanitation) . . . . .	106
G. J. Hucker	
Milk and Dairy Products (Improving the Quality of Milk Supplies in Small Communities) . . . . .	109
(Prepared by C. J. Babcock)	
Merrill J. Mack, <i>Chairman</i>	
INDUSTRIAL HYGIENE SECTION:	
Skin Irritants . . . . .	114
Louis Schwartz, M.D., <i>Chairman</i>	
Ventilation and Atmospheric Pollution . . . . .	115
Emery R. Hayhurst, M.D., Ph.D., <i>Chairman</i>	
Part I—Suggested Standards . . . . .	115
Present Trends and Recent Developments in Air Conditioning . . . . .	116
C. P. Yaglou	
Part II—Standard Methods for the Examination of Air . . . . .	118
Emery R. Hayhurst, M.D., Ph.D., <i>Chairman</i>	
I. Report of Subcommittee on Physical Procedures in Air Analysis . . . . .	118
C. P. Yaglou, <i>Chairman</i>	
II. Report of Subcommittee on Chemical Methods in Air Analysis: Specific Atmospheric Contaminants—Carbon Monoxide . . . . .	118
F. H. Goldman, <i>Chairman</i>	
III. Report of Subcommittee on Dust Procedures in Air Analysis: Review and Discussion of New Developments in the Sampling and Counting of Industrial Dusts . . . . .	125
J. J. Bloomfield, <i>Chairman</i>	
IV. Report of Subcommittee on Bacteriological Procedures in Air Analysis: Quantitating Gordon's Bacterial Test for Estimating Pollution of Air . . . . .	129
W. F. Wells, <i>Chairman</i>	
LABORATORY SECTION:	
Analyzing Frozen Desserts (Analyzing Frozen Desserts and Ingredients) . . . . .	135
Friend Lee Mickle, Sc.D., <i>Chairman</i>	
F. W. Fabian, Ph.D., <i>Chairman</i> (Food and Nutrition Section Committee)	
Biological Products . . . . .	137
Elliott S. Robinson, M.D., <i>Chairman</i>	
Examination of Dairy Products . . . . .	138
R. S. Breed, Ph.D., <i>Chairman</i>	
Standard Methods for the Examination of Shellfish (Tentative Standard Procedure for the Bacteriological Examination of Shellfish and Shellfish Waters)	
James Gibbard, <i>Chairman</i>	
Mimeographed and distributed by the American Public Health Association.	
Recognition of Pneumococcus Types Associated with Pneumonia for the Standard Methods Committee on Diagnostic Procedures and Reagents (Terminology for New Pneumococcus Types) . . . . .	139
W. D. Sutliff, M.D., <i>Referee</i>	
VITAL STATISTICS SECTION:	
Study of Methods of Estimating Population . . . . .	141
J. V. DePorte, Ph.D., <i>Chairman</i>	
Utilization of Vital Statistics Data During the 1940 Census Period . . . . .	142
W. Thurber Fales, Sc.D., <i>Chairman</i>	
WESTERN BRANCH, American Public Health Association:	
Sylvatic Plague . . . . .	145
K. F. Meyer, Ph.D., M.D., <i>Chairman</i>	

# GUIDE TO PERSONNEL OF COMMITTEES AND SUBCOMMITTEES OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

	PAGE		PAGE
Accident Statistics .....	34	Lead Poisoning .....	36
Accuracy of Certified Causes of Death.....	25	Manual of Practice and Appraisal of Local Health Work .....	22
Administrative Practice .....	22	Master Plans for WPA Projects.....	34
American Museum of Hygiene.....	29	Measles .....	24
Analyzing Frozen Desserts.....	33, 35	Membership (P.H.N.) .....	37
Assay of Foods.....	35	Membership (V.S.) .....	34
Autopsies .....	25	Membership and Fellowship (F.N.).....	35
Bacteriological Procedures (Examination of Air) ..	36	Membership and Fellowship (M.C.H.).....	37
Bathing Places .....	29, 30	Merit Systems .....	28
Bedside Nursing .....	23	Microbiological Examination of Foods.....	35
Chemical Procedures (Examination of Air).....	36	Milk and Dairy Products.....	35
Communicable Disease Control.....	25	Municipal Public Health Engineering.....	30
Community Organization for Health Education..	38	Nominating Committee (Assn.).....	28
Constitution and By-Laws.....	28	Nutritional Problems .....	35
Contest Grading .....	23	Organized Care of the Sick.....	24
Contest Study .....	23	Physical Procedures (Examination of Air).....	36
Coördinating Committee (Standard Methods)....	31	Plumbing .....	30
Coördinating Committee (F.N.).....	36	Pneumoconiosis .....	36
Coördination of Activities.....	37, 38	Professional Education .....	26
Coördination of Public Health Engineering Activi- ties .....	29, 38	Program Committee (Assn.).....	28
Dentistry .....	37	Program Committee (M.C.H.).....	37
Diphtheria .....	24	Public Health and the National Defense.....	28
Disinfection of Dishes and Utensils.....	29	Public Health Nursing.....	23
Dust Procedures (Examination of Air).....	36	Recreational Facilities .....	26
Editorial Board (A.J.P.H.).....	19	Research and Standards.....	25
Editorial Committee (Prof. Educ.).....	28	Sanitation .....	23
Educational Qualifications:		Scarlet Fever .....	24
Cancer Specialists .....	28	School Health Policies.....	38
Crippled Children Specialists.....	27	Scientific Exhibits (Assn.).....	29
Health Educators .....	27	Scientific Exhibits (M.C.H.).....	37
Health Officers .....	26	Sedgwick Memorial Medal.....	29
Industrial Hygienists .....	27	Sewage Disposal .....	30
Laboratory Personnel .....	27	Shellfish .....	30
Maternal and Child Health Specialists.....	27	Skin Irritants .....	36
Mental Hygienists .....	27	Standard Methods:	
Pneumonia Control Officers.....	28	Analyzing Frozen Desserts and Ingredients (Lab.) .....	33
Professional Personnel in Sanitation.....	26	Biological Products .....	33
Public Health Dentists.....	28	Biology of the Laboratory Animal.....	33
Public Health Nurses.....	27	Coördinating Committee .....	31
Public Health Nutritionists.....	27	Diagnostic Procedures and Reagents.....	31
Public Health Statisticians.....	27	Examination of Dairy Products.....	32
Tuberculosis Directors .....	27	Examination of Shellfish.....	34
Undergraduates in Preventive Medicine.....	27	Examination of Water and Sewage.....	32
Venereal Disease Control Officers.....	28	Standard Practices in the Problem of Compensa- tion of Occupational Diseases.....	36
Effects of Rehousing .....	26	Standards of Occupancy.....	26
Eligibility .....	22	State Health Administration.....	23
Endemic Goiter .....	24	Study of Methods of Estimating Population....	34
Evaluation of Administrative Practices.....	24	Study of State Administration of Health Educa- tion .....	38
Examination of Air.....	36	To Develop Principles and Criteria for the Allo- cation of Public Health Funds from the State to the Local Level.....	23
Examination of Dishwashing Devices.....	25	To Study Duties of Nurses in Industry.....	37
Executive Committee (C.A.P.).....	22	To Study Relationships Between Official and Non- official Agencies .....	37
Executive Committee (Hygiene of Housing).....	26	To Study the Creation of a Section on School Health .....	29
Executive Committee (R. & S.).....	25	To Study the Work of the Section (Educ.).....	38
Field Experience Centers.....	28	Tuberculosis Control Procedures.....	24
Field Studies .....	26	Typhoid Fever .....	24
Food Utensil Sanitation.....	35	Universal Registration .....	34
Foods (Except Milk).....	35	Utilization of Vital Statistics Data During the 1940 Census Period.....	34
Forms and Methods of Statistical Practice.....	34	Ventilation and Atmospheric Pollution.....	36
Ground Water Pollution.....	30	Volatile Solvents .....	37
Health Conservation Contests.....	23	Water Supply .....	30
Home Safety .....	26	Waterways Pollution .....	30
Home Sanitation .....	26	Whooping Cough .....	24
Household Operation .....	26		
Housing (H.O.) .....	38		
Housing Codes .....	26		
Housing Survey Procedures.....	26		
Hygiene of Housing.....	25		
Illumination .....	26		
Industrial Anthrax .....	37		
Industrial Health Studies.....	24		
Industrial Sanitation .....	30		
Laboratory Section Representative on the Commis- sion for the Study of Biological Stains.....	34		



# THE AMERICAN PUBLIC HEALTH ASSOCIATION

## GOVERNING COUNCIL

### OFFICERS 1940-1941

*President*, W. S. LEATHERS, M.D., Nashville, Tenn.  
*President-Elect*, JOHN L. RICE, M.D., New York, N. Y.  
*Vice-President*, ROBERT D. DEFRIES, M.D., Toronto, Ont.  
*Vice-President*, CARLOS E. FINLAY, M.D., Havana, Cuba  
*Vice-President*, SELSKAR M. GUNN, New York, N. Y.  
*Treasurer*, LOUIS I. DUBLIN, Ph.D., New York, N. Y.  
*Chairman of Executive Board*, ABEL WOLMAN, Dr. Eng., Baltimore, Md.  
*Executive Secretary*, REGINALD M. ATWATER, M.D., New York, N. Y.

### EXECUTIVE BOARD

*Chairman*, ABEL WOLMAN, Dr. Eng., Baltimore, Md. (1942)  
 WALTER H. BROWN, M.D., Palo Alto, Calif. (1941)  
 J. A. DOULL, M.D., Cleveland, O. (1942)  
 LOUIS I. DUBLIN, Ph.D., New York, N. Y. (*Treasurer*)  
 W. S. LEATHERS, M.D., Nashville, Tenn. (*President*)  
 FRIEND LEE MICKLE, Sc.D., Hartford, Conn. (1941)  
 THOMAS PARRAN, M.D., Washington, D. C. (1943)  
 JOHN L. RICE, M.D., New York, N. Y. (*President-Elect*)  
 HUNTINGTON WILLIAMS, M.D., Baltimore, Md. (1943)

### ELECTIVE COUNCILORS

#### Terms Expiring 1941

E. L. BISHOP, M.D., Chattanooga, Tenn.  
 DOROTHY DEMING, R.N., New York, N. Y.  
 NAOMI DEUTSCH, R.N., Washington, D. C.  
 J. A. DOULL, M.D., Cleveland, O.  
 ALLEN W. FREEMAN, M.D., Baltimore, Md.  
 JOHN F. NORTON, Ph.D., Kalamazoo, Mich.  
 J. L. POMEROY, M.D., Los Angeles, Calif.  
 DEAN FRANKLIN SMILEY, M.D., Ithaca, N. Y.  
 C. E. A. WINSLOW, Dr. P.H., New Haven, Conn.  
 C. C. YOUNG, D.P.H., Lansing, Mich.

#### Terms Expiring 1942

J. N. BAKER, M.D., Montgomery, Ala.  
 RICHARD A. BOLT, M.D., Cleveland, O.  
 KARL F. MEYER, Ph.D., San Francisco, Calif.  
 HARRY S. MUSTARD, M.D., New York, N. Y.  
 GEORGE H. RAMSEY, M.D., White Plains, N. Y.  
 W. S. RANKIN, M.D., Charlotte, N. C.  
 ROBERT H. RILEY, M.D., Baltimore, Md.  
 L. R. THOMPSON, M.D., Washington, D. C.  
 W. FRANK WALKER, Dr. P.H., New York, N. Y.  
 ROBERT E. WODEHOUSE, M.D., Ottawa, Ont.

#### Terms Expiring 1943

M. E. BARNES, M.D., Iowa City, Ia.  
 A. GRANT FLEMING, M.D., Montreal, Que.  
 LESLIE C. FRANK, C.E., Washington, D. C.  
 IRA V. HISCOCK, Sc.D., New Haven, Conn.  
 A. PARKER HITCHENS, M.D., Philadelphia, Pa.  
 PEARL MCIVER, R.N., Washington, D. C.  
 ROY J. MORTON, Nashville, Tenn.  
 J. T. PHARR, M.B., Toronto, Ont.  
 SAMUEL C. PRESCOTT, Sc.D., Cambridge, Mass.  
 FELIX J. UNDERWOOD, M.D., Jackson, Miss.

### REPRESENTATIVES OF AFFILIATED SOCIETIES AND BRANCHES

#### Public Health Associations:

J. D. DUNSHEE, M.D., Arizona  
 DR. R. L. CLEERE, Colorado  
 JOSEPH I. LINDE, M.D., Connecticut  
 MARK F. BOYD, M.D., Florida  
 M. E. WINCHESTER, M.D., Georgia  
 LAWRENCE J. PETERSON, Idaho  
 WALTER L. BIERRING, M.D., Iowa  
 HAROLD D. CHOPE, M.D., Massachusetts  
 ———, Michigan  
 THOMAS CHAMBERLAIN, Missouri  
 MYRTLE GREENFIELD, New Mexico  
 HAZEL CORBIN, New York City  
 LOUIS OLSEN, Northern California

### SECTION OFFICERS

#### Health Officers

*Chm.*, EARLE G. BROWN, M.D., Mineola, N. Y.  
*Vice-Chm.*, FRED ADAMS, M.D., Windsor, Ont.  
*Secy.*, E. R. COFFEY, M.D., Washington, D. C.  
*Section Council*, GREGOIRE F. AMYOT, M.D., Victoria, B. C., EDWARD S. GODFREY, Jr., M.D., Albany, N. Y., JOHN P. KOEHLER, M.D., Milwaukee, Wis., HENRY F. VAUGHAN, Dr. P.H., Detroit, Mich., ADOLPH WEINZIRL, M.D., Portland, Ore.

#### Laboratory

*Chm.*, ELLIOTT S. ROBINSON, M.D., Boston, Mass.  
*Vice-Chm.*, JAMES GIBBARD, Ottawa, Ont.  
*Secy.*, EDMUND K. KLINE, Dr. P.H., Olean, N. Y.

#### Vital Statistics

*Chm.*, R. N. WHITFIELD, M.D., Jackson, Miss.  
*Vice-Chm.*, SELWYN D. COLLINS, Ph.D., Washington, D. C.  
*Secy.*, JOHN COLLINSON, M.D., Washington, D. C.

#### Engineering

*Chm.*, HARRY B. HOMMON, San Francisco, Calif.  
*Vice-Chm.*, JAMES LLOYD BARRON, C.E., Hempstead, N. Y.  
*Secy.*, A. H. FLETCHER, Baltimore, Md.

#### Industrial Hygiene

*Chm.*, W. J. MCCONNELL, M.D., New York, N. Y.  
*Vice-Chm.*, WILLIAM P. YANT, Pittsburgh, Pa.  
*Secy.*, J. J. BLOOMFIELD, Washington, D. C.

#### Food and Nutrition

*Chm.*, ALBERT C. HUNTER, Ph.D., Washington, D. C.  
*Vice-Chm.*, HENRY T. SCOTT, Ph.D., Madison, Wis.  
*Secy.*, MARIETTA EICHELBERGER, Ph.D., Chicago, Ill.

#### Maternal and Child Health

*Chm.*, ESTELLA F. WARNER, M.D., Albuquerque, N. M.  
*Vice-Chm.*, CHARLES C. WILSON, M.D., Hartford, Conn.  
*Secy.*, HOWARD B. METTEL, M.D., Indianapolis, Ind.

#### Public Health Education

*Chm.*, THOMAS G. HULL, Ph.D., Chicago, Ill.  
*Vice-Chm.*, DELBERT OBERTEUFFER, Ph.D., Columbus, O.  
*Secy.*, SALLY LUCAS JEAN, New York, N. Y.

#### Public Health Nursing

*Chm.*, RUTH HOULTON, R.N., New York, N. Y.  
*Vice-Chm.*, LAURA A. DRAPER, R.N., Minneapolis, Minn.  
*Secy.*, HELEN BEAN, R.N., New Orleans, La.

#### Epidemiology

*Chm.*, JOHN A. FERRELL, M.D., New York, N. Y.  
*Vice-Chm.*, ALTON S. POPE, M.D., Boston, Mass.  
*Secy.*, E. L. STEBBINS, M.D., New York, N. Y.





# CONSTITUTION AND BY-LAWS AMERICAN PUBLIC HEALTH ASSOCIATION

As Adopted at the Fifty-eighth Annual Meeting, and Amended at the  
Sixty-ninth Annual Meeting

## CONSTITUTION

### ARTICLE I NAME

The name of this Association, incorporated under the laws of Massachusetts, is the American Public Health Association.

### ARTICLE II OBJECT

The object of this Association is to protect and promote public and personal health.

### ARTICLE III GOVERNING COUNCIL

A. *Composition*: There shall be a Governing Council consisting of:

1. The officers of the Association and the elective members of the Executive Board.

2. Thirty members of the Council, to be elected by and from the Fellowship of the Association, for three-year terms, one-third retiring each year. These members of the Council shall be nominated and elected as provided for in the By-laws.

If one of these members is elected a Section Chairman, Vice-Chairman, or Secretary, or appointed the representative of an Affiliated Society, or a Regional Branch, a new Councilor to fill such vacancy shall be elected by the Governing Council.

3. The Chairman, Vice-Chairman, and Secretary of each Section.

4. Representatives to be appointed by Affiliated Societies as provided for in the By-laws. Such representatives shall be Fellows of the American Public Health Association.

5. The elective members of the Council of the Health Officers Section.

6. A representative to be designated by each regional branch. Such representative shall be a Fellow of the American Public Health Association.

B. *Terms*: Terms of Councilors shall begin at the end of the annual meeting when elected, and shall terminate at the end of the annual meeting at expiration of term; provided that Councilors shall have the right to attend meetings of the Council in an advisory capacity as soon as elected.

C. *Reëlection*: After two consecutive terms, an elective Councilor shall be ineligible for re-election to the Council during one Association year.

D. *The Officers of the Association* shall be the officers of the Council.

E. *Functions*: The functions of the Council shall be:

1. To establish policies for the Association and for the guidance of the Executive Board and the officers.

2. To establish Sections of the Association; to combine or discontinue them when necessary; to maintain coördination among them; and to formulate general rules governing the policies of the Sections.

3. To consider all resolutions proposed for approval in the name of the Association, and to receive and act upon a report from a committee on resolutions appointed by the President at each annual meeting.

4. To elect and establish qualifications for Fellows, Honorary Fellows, Life Members, Affiliated Societies and Regional Branches, and to recognize Associated Organizations as provided in the By-laws.

5. To elect the Executive Board and the officers of the Association with the exception of the Chairman of the Executive Board and the Executive Secretary.

6. To approve all standards promulgated in the name of the Association.

7. To receive from the Executive Board at its first session, at the time and place of the annual meeting of the Association, a definitely formulated statement of a program of the major activities proposed for the ensuing year. To require a report from the Chairman of the Executive Board in which the work, the accomplishments and the financial status of the Association during the year preceding such annual meeting shall be reviewed.

8. To publish after each of its meetings an abstract of the minutes of such meetings.

F. *A Quorum* of the Council shall consist of ten Councilors.

G. *Meetings* of the Council shall be called by the Executive Secretary at the request of the President, or at the request in writing of any twelve Councilors. In the latter case, the call to meeting, issued at least twenty days in advance, shall state the purpose of the meeting.

### ARTICLE IV OFFICERS

The officers of this Association shall be a President, a President-elect, three Vice-Presi-

dents, an Executive Secretary, a Treasurer, and the Chairman of the Executive Board. The officers, with the exception of the Chairman of the Executive Board and the Executive Secretary, shall be elected by written ballot of the Governing Council as provided in this article and in the By-laws. The President-elect shall serve as such from the close of the annual meeting at which he was elected to the close of the next annual meeting, when he shall automatically become President. As President he shall serve to the close of the next succeeding annual meeting. However, in case of the inability of the President to complete his term for any reason, the President-elect shall at once succeed to the duties of President, filling the unexpired term of his predecessor and his own term consecutively. Other officers shall serve from the close of the annual meeting when elected, until the close of the next annual meeting, and all officers shall serve in any case until their successors are elected and qualified.

A majority vote of the Councilors voting shall be required to elect, and if no candidate receives a majority vote on the first ballot, the candidate receiving the smallest number of votes shall be dropped after each ballot in succession until a majority vote is obtained. The Chairman of the Executive Board and the Executive Secretary shall be elected by the Executive Board, which Board shall define the duties and authority of these officers, respectively.

#### ARTICLE V AMENDMENTS

This Constitution may be amended by a two-thirds vote of the Fellows of the Association present and voting at an annual meeting, provided that the specific amendment to be acted upon is published in the official publication of the Association not less than thirty days prior to the meeting, and provided further that the amendment has received the approval of the Governing Council.

### BY-LAWS

#### ARTICLE I MEMBERSHIP AND DUES

A. There shall be eight classes of constituents who may be elected from any country. The respective appellations, qualifications for election, and dues shall be as follows:

1. *Fellows*: Professional health workers who have been members of the Association for at least two years, and who are of established professional standing (whether employed by public or private organizations or in independent private practice), shall be eligible for election as Fellows, provided that the applicant shall have reached his thirtieth birthday at the time application for Fellowship is made.

The following persons shall be considered to have an established standing in the profession of public health for this purpose:

a. A person who has been awarded in course a degree of Doctor of Public Health, Doctor of Science in Public Health, Doctor of Philosophy in Public Health, Doctor of Medicine with at least one year of graduate study in public health in a university, or other equivalent degrees, according to standards approved by the Executive Board of the American Public Health Association, after approval by the appropriate Section Council, or, in the case of applicants for unaffiliated Fellowship, by the Executive Board.

b. A person who has been awarded in course an academic or professional degree involving training in public health and who

has been regularly engaged in health work for at least five years, having rendered meritorious service as a health officer or in responsible charge of work in either a public or private health agency, after approval by the appropriate Section Council, or, in the case of applicants for unaffiliated Fellowship, by the Executive Board.

c. A person who has done notable original work in public health or preventive medicine of a character to give him a recognized standing, and who is unanimously endorsed for Fellowship by the Committee on Eligibility after approval by unanimous vote of the appropriate Section Council, or, in the case of applicants for unaffiliated Fellowship, by the Executive Board.

d. A person regularly engaged in health work for at least five years, who has given evidence of special proficiency, who has attained a recognized standing, and who is endorsed for Fellowship by not less than a two-thirds vote of the Committee on Eligibility after approval by unanimous vote of the appropriate Section Council, or, in the case of applicants for unaffiliated Fellowship, by the Executive Board.

e. A teacher of public health or one of its constituent sciences who has attained distinction as an expounder of the principles of public health or its constituent sciences, and who is endorsed for Fellowship by not less than a two-thirds vote of the Committee on Eligibility, after approval by unanimous vote

of the appropriate Section Council, or, in the case of applicants for unaffiliated Fellowship, by the Executive Board. Such a teacher shall have had at least five years' experience as a teacher of public health subjects. Any years of experience as defined in paragraphs "b" and "d" that the applicant may have had shall be considered the equivalent of the same number of years' experience as a "teacher."

f. A person not covered by the above, who has made substantial contributions to public health work in his chosen branch, who has attained a recognized professional standing, and who is endorsed for Fellowship by not less than a two-thirds vote of the Committee on Eligibility after approval by unanimous vote of the appropriate Section Council, or, in the case of applicants for unaffiliated Fellowship, by the Executive Board.

The application for Fellowship shall be made on an approved form and shall be sponsored by two Fellows of the Association who shall be Fellows of the Section with which affiliation is desired, provided, however, that when affiliation with a Section is not desired, the sponsors may be any two Fellows in good standing in the Association. Fellows without Section affiliation shall be known as unaffiliated Fellows.

When the application has been duly sponsored and otherwise completed, it shall be transmitted to the Administrative Office of the Association, which shall make note thereon of such knowledge as it may have concerning the standing of the applicant in the Association. The application shall be forwarded by the Administrative Office to the Secretary of the Section in which affiliation is desired, for the approval of the Section Council, and, when acted upon by the Section Council, it shall be returned to the Administrative Office by the Secretary of the Section, after he has made endorsement on the application of the action of the Section Council. When the application is for unaffiliated Fellowship, the Executive Board of the Association shall act in place of the Section Council. When the application has been approved by the Section Council or the Executive Board, as above provided, it shall be voted upon by the Governing Council, provided the name of the applicant shall have been officially published at least fifteen days in advance, and provided further that the application shall have been approved by the Committee on Eligibility.

A Fellow may belong to and vote in only one Section, but such affiliation may be transferred to another Section if approved by vote of a majority of the Council of the latter Section. Unaffiliated Fellows may become affil-

ated with a Section if approved by vote of a majority of the Council of the Section with which affiliation is desired.

The right to hold office or to serve as chairman of a committee in the Association shall be limited to the Fellows of the Association, whether Section Fellows or unaffiliated Fellows. The right to hold office or to serve as chairman of a committee in a Section shall, however, be limited to the respective Fellows in such Section. This provision shall not prevent the election of a Vice-President of the Association who may not be a Fellow.

The dues of Fellows shall be \$10.00 per year.

2. *Honorary Fellows:* Honorary Fellows may be elected by the Governing Council for distinguished service in public health. Honorary Fellowship shall not include voting power or payment of dues. However, those Honorary Fellows who have previously been Fellows of the Association shall retain all the privileges of Fellowship.

3. *Members:* Persons professionally engaged or interested in public health work shall be eligible for election as members when sponsored by two members or Fellows of the Association. They may serve on committees, except as chairmen. Dues \$5.00 per year. A member may belong to only one Section, but such affiliation may be transferred to another Section if approved by vote of a majority of the Council of the Section to which change is desired. Unaffiliated members may become affiliated with a Section if approved by vote of a majority of the Council of the Section with which affiliation is desired.

4. *Sustaining Members:* Individuals or corporations interested in public health may be elected to Sustaining Membership. Dues \$50.00 or more per year.

5. *Affiliated Societies:* A state or provincial public health association or similar regional society including more or less than a state, primarily composed of professional public health workers and organized for the same general objects as the American Public Health Association, may be elected as an Affiliated Society, provided that not less than twenty of its active members and at least one-half of its active members are members or Fellows of the American Public Health Association. Not more than one such society shall be admitted from the same area.

A society applying for affiliation shall submit a copy of its constitution and by-laws, its last annual budget, a roster of its members and such other evidences of its qualifications as may be required. It shall submit annually and at other times such reports on its financial standing, membership and other matters as

may be required by the Executive Board of the American Public Health Association.

The Committee on Eligibility shall consider all applications for affiliation and report its recommendations to the Governing Council.

The annual dues of Affiliated Societies shall be one per cent of their gross annual income, the minimum dues per society being \$10.00 per year.

For every Fellow or member paying annual dues to the American Public Health Association, the American Public Health Association shall remit to the Affiliated Society of which such person is a member the sum of \$1.00 per annum.

6. *Associated Organizations:* The Governing Council at its discretion may recognize as Associated Organizations other autonomous agencies constituting professional societies.

7. *Life Members:* Upon the recommendation of the Committee on Eligibility any individual member of the Association may be elected a member for life. Election to this grade shall not affect the privileges held by such individual in his previous grade of membership. The dues for Life Members shall be \$100.00, payable within one year after election, and this payment by such member shall exempt him from any further dues.

8. *Regional Branches:* The Governing Council may at its discretion establish regional branches of the Association.

B. *Election:* The election of Fellows (see A1 above), Honorary Fellows, Life Members, Affiliated Societies and Regional Branches, and the recognition of Associated Organizations shall be by the Governing Council.

The election of members and Sustaining Members shall be by the Executive Board.

Three-fourths of the votes cast shall be requisite for election.

Upon the recommendation of the Committee on Eligibility the Governing Council may discontinue the membership, Fellowship or affiliation of any constituent. Three-fourths of the votes cast shall be necessary for such action.

C. *Dues:* Dues are payable annually in advance. All constituents paying dues shall be entitled to receive the AMERICAN JOURNAL OF PUBLIC HEALTH and/or, such other publications as may be designated by the Executive Board, which shall determine the proportion of dues to be devoted to this purpose.

Constituents of any class whose dues are unpaid for six months or more shall be considered not in good standing. Constituents not in good standing shall not be entitled to vote,

hold office or enjoy other privileges or powers of membership. Good standing may be resumed upon the payment of all arrears and dues in advance for one year, provided, however, the lapsed period is not greater than one year. The Administrative Office shall notify by registered mail all constituents who have been in arrears for a period of eleven months. The names of constituents in any class whose dues remain unpaid for one year or more shall be presented to the Executive Board which shall order the names of such constituents stricken from the membership roll, provided, however, such constituents have been duly notified as hereinbefore provided in this paragraph. Constituents whose names have been stricken from the rolls in this manner may be again admitted in the manner provided for the election of new constituents in the class for which they make application, provided such person or organization complies with the eligibility requirements at the time the new application is made.

D. *Involuntary Termination of Membership:* If, in the opinion of the Executive Board, any member or Fellow of the Association permits the use of his name, or otherwise allows himself to be quoted or used for illustration in the advertising of a commercial product, in such a manner as to reflect discredit upon the Association, his Fellowship or membership in the Association shall thereupon be terminated.

## ARTICLE II GOVERNING COUNCIL

The thirty members of the Governing Council designated in Article III, Section A, Paragraph 2 of the Constitution, shall be nominated and elected as follows: There shall be a Nominating Committee composed of one Fellow elected by each Section at the preceding annual meeting, and an additional Fellow designated by the Executive Board, the latter serving as Chairman. This committee shall present to the Administrative Office at least two months before the next annual meeting the names of at least twenty and not more than thirty Fellows of the Association selected with due regard to geographical and membership considerations as nominees for the Governing Council. The Administrative Office shall publish this list to the membership. Upon the petition of twenty-five Fellows the Nominating Committee shall add the name of any Fellow to this list provided such petition is received fifteen days before the annual meeting. The time for closing the polls shall be determined each year by the Executive Board. The Fellows receiving the highest

number of votes on a written ballot cast by the Fellows present and voting at the annual meeting shall be declared elected to fill existing vacancies. Should two or more candidates receive the same number of votes, the Executive Board shall, when necessary, determine by written ballot the order of precedence.

### ARTICLE III EXECUTIVE BOARD

**A. Composition:** There shall be an Executive Board of nine members elected by the Governing Council, six of whom shall be at the time of their election past or present members of the Governing Council, and three of whom shall be the President, the President-elect, and the Treasurer.

1. When a Fellow accepts membership on the Executive Board, any position he may hold on any of the standing committees of the Association will thereupon automatically become vacant.

2. If a vacancy on the Executive Board shall occur after the annual meeting because of the preference of an elected member to retain his standing committee membership, the President shall designate a nominating committee for this purpose from the membership of the Governing Council and this committee shall nominate not less than three candidates for the vacancy, from whom the candidate receiving the highest number of votes of the Governing Council in a mail ballot shall be declared elected to the Executive Board to fill the vacancy.

**B. Terms:** The terms of the President, the President-elect, and the Treasurer as Executive Board members shall be one year each. The terms of the other members shall be three years each, expiring in rotation, two each year. Should a vacancy occur the Governing Council shall elect a member to fill such vacancy for the unexpired term. The terms of the members of the Executive Board shall begin at the end of the annual meeting at which they have been elected, and shall continue until the end of the annual meeting at expiration of term, provided that newly elected members of the Board shall have the right to attend meetings as soon as elected, and shall have no vote until installed.

**C. Reëlection:** After two consecutive terms of three years a member of the Executive Board shall be ineligible for reëlection during one Association year. This provision shall not apply to an officer of the Association.

**D. Officers:** The Executive Board shall elect from its own membership a Chairman who shall serve in that capacity for such term as

the Executive Board shall determine. It shall also designate such other officers of the Board as it may require for the conduct of its business.

#### **E. Duties:**

1. To direct the administrative work of the Association.

2. To act as Trustee of the Association's properties.

3. To plan methods for the procurement of funds.

4. To recommend budgets for the Association's work.

5. To conform to the policies of the Governing Council in the conduct of its work.

6. To appoint the members of the standing committees and to authorize and confirm the appointment of all other Association committees.

7. To transmit a report of its proceedings and transactions to the Governing Council at least thirty days before each annual meeting.

8. In general to carry out the policies of the Governing Council between meetings of the latter.

**F. A Quorum** of the Executive Board shall consist of four members.

### ARTICLE IV OFFICERS

The officers elected by the Governing Council shall be nominated from the floor by that body.

### ARTICLE V COMMITTEES

There shall be four standing committees of the Association as follows:

1. Committee on Eligibility.

2. Committee on Administrative Practice.

3. Committee on Research and Standards.

4. Committee on Professional Education.

**A. Organization:** All of the standing and special committees of the Association shall be authorized and appointed by the Executive Board unless otherwise provided for in these By-laws. Unless otherwise provided for all Section committees shall be named by the respective Sections, but the personnel of such committees shall be subject to confirmation by the Executive Board. The appointments of all Association and Section committees unless otherwise provided for in these By-laws shall expire at the next annual meeting. The chairmen of the standing committees shall be designated by the Executive Board. The standing committees shall designate from among their membership such other officers as they may require for the conduct of their business. Each committee shall control its

policies within limitations prescribed by the Governing Council and the Executive Board.

The Executive Secretary shall be a member, ex-officio, of all standing committees, and shall serve as secretary of each such committee.

#### B. *Composition and Functions:*

1. The Committee on Eligibility shall consist of one Fellow to be elected by each Section and an additional Fellow elected by the Executive Board, the latter serving as Chairman. Members shall serve for a term of two years.

This committee shall pass upon the eligibility of Fellows, members and other constituents in accordance with the provisions of the By-laws.

2. The Committee on Administrative Practice shall consist of fifteen Fellows as follows: Twelve shall be designated by the Executive Board to serve for a term of four years, the terms of three members of this committee expiring each year. The remaining three members of this committee shall be elected annually by and from the Fellows of the Association, affiliated with the Health Officers Section.

This committee shall engage in the collection of information regarding current public health practices and analyze the material obtained to derive standards of organization and achievement. The findings and standards may be made available to public health workers through publications, information and field service under such conditions as the committee may establish. No standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council.

3. The Committee on Research and Standards shall consist of fifteen Fellows representative of the various Sections of the Association appointed by the Executive Board. Members shall serve for a term of three years, the terms of five members expiring each year.

This committee shall be responsible for carrying out research and the development of standards in the technical branches of public health service, and coördinate such research and standardization. This committee shall also be charged with the duty of reviewing from time to time standards already established. No standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council.

4. The Committee on Professional Education shall consist of ten Fellows appointed by the Executive Board. Members shall serve for a term of five years, the terms of two members expiring each year.

This committee shall be responsible for carrying out research and the development of standards for professional education and training in public health work and shall perform such other functions as may be delegated to the committee by the Governing Council with the view of maintaining professional qualifications of high standard. No standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council.

#### ARTICLE VI MEETINGS OF THE ASSOCIATION

There shall be at least one annual meeting of the Association, held at a place to be selected by the Governing Council. Special meetings of the Association may be called by a majority vote of the Governing Council, the Executive Board, or the Association. In all proceedings of the Association *Robert's Rules of Order* shall be official.

#### ARTICLE VII SECTIONS

The Executive Board shall approve rules and regulations relating to the government of the Sections, and to the appointment of administrative committees. Sections shall elect their own officers.

*Nominating Committee:* The Section Chairman with the advice of the Section Council shall appoint a *Committee on Nominations* at least fifteen days before each annual meeting. The Section Secretary shall be a member of such Committee.

The names of the members of the Committee on Nominations shall be announced at the first meeting of the Section, at each annual meeting of the Association. The Committee on Nominations shall present at the second meeting of the Section a list of nominees for the Section offices, and for membership in the Section Council; provided that if the name of any Fellow be transmitted to the Nominating Committee over the signature of ten Fellows of the Section prior to the second meeting of the Section, the Nominating Committee shall add the name of such Fellow to its own list of nominees.

A. *Officers* of each Section shall be a Chairman, a Vice-Chairman, and a Secretary. The Chairman, Vice-Chairman, and Secretary shall be the representatives of the Section to the Governing Council of the Association.

B. *Terms:* New terms begin and old terms expire at the end of annual meetings. After five consecutive years in any elective Section office, except that of Secretary, a member shall be ineligible to reelection to that office during one Association year.

C. *The Chairman* shall preside at meetings of the Section.

D. *The Vice-Chairman* shall preside at meetings of the Section in the absence of the Chairman.

E. *The Secretary* of the Section shall prepare the scientific program of the Section for the annual meeting, subject to the recommendations of the Section Council, and he shall submit same to the Administrative Office and shall keep the minutes, and other records of the Section, and shall transmit to the Executive Secretary of the Association a copy of the minutes of both business and scientific sessions as soon as practicable thereafter. When unable to be present at meetings, he shall thoroughly instruct a substitute as far in advance of the meeting as possible.

F. *Section Council*: There shall be a Section Council composed of the three officers of the Section and five members, who shall be Fellows of the Section.

*Terms* of members of the Section Council shall be five years each. In the beginning one shall serve for one year, one for two, one for three, one for four, and one for five years.

*Duties* of the Section Council shall be:

1. To recommend papers, and to make general recommendations in relation to the annual meeting program.

2. To advise on Section membership.

3. To advise on Section policies.

4. To submit annually to the Governing Council through the Executive Board a report of the transactions of the Section.

5. To report annually to the Governing Council through the Executive Board on the plans, scope and policy of the Section during the succeeding year.

6. To formulate rules of procedure for the Section.

7. To approve and transmit to the Governing Council resolutions originating in the Section.

8. To advise on the publication of papers and reports presented at the Section meetings.

9. To advise with respect to the appointment of technical committees, subcommittees

or Section representatives on committees of the Association.

#### ARTICLE VIII FINANCES

All remittances to the Association shall be deposited to the account of the Treasurer. The Treasurer shall be custodian of investments of the Association and shall disburse funds in accordance with duly authorized vouchers. With the approval of the Executive Board he may establish a drawing account for the Executive Secretary, who shall send to members of the Executive Board a financial summary of receipts and disbursements each month. Once each month, or oftener if called for, he shall also forward to the Treasurer and to the Chairman of the Executive Board an itemized statement of all expenditures. The Executive Secretary and the Treasurer shall be bonded at the expense of the Association in an amount to be determined by the Executive Board. The books of the Association shall be audited annually by certified public accountants, to be appointed by the Executive Board.

#### ARTICLE IX PUBLICATIONS

All publications of the Association and of its Sections shall be issued under the direction of the Executive Board. The Executive Board shall appoint a Managing Editor of the official journal and an Editorial Board of not less than five members, to serve at the pleasure of the Executive Board. All papers and reports for the annual meetings are to be accepted with the understanding that they shall be the property of the Association for publication, unless this right is waived by the Managing Editor.

#### ARTICLE X AMENDMENTS

These By-laws may be amended by a two-thirds vote of those voting on the Governing Council during the annual meeting, provided that twenty-four hours prior written notice thereof has been given. The By-laws may further be amended by a two-thirds vote of those voting at any meeting of the Governing Council called for the purpose, provided that notice thereof shall have been given at least fifteen days prior to such meeting.



# ANNUAL MEETINGS

Preliminary Meeting	.....	New York, N. Y., April 18.....	1872
"	"	.....Long Branch, N. J., September 12.....	1872
1st Annual Meeting	.....	.....Cincinnati, O., May 1-3.....	1873
2d	"	.....New York, N. Y., November 11-14.....	1873
3d	"	.....Philadelphia, Pa. ....	1874
4th	"	.....Baltimore, Md. ....	1875
5th	"	.....Boston, Mass. ....	1876
6th	"	.....Chicago, Ill. ....	1877
7th	"	.....Richmond, Va. ....	1878
8th	"	.....Nashville, Tenn. ....	1879
9th	"	.....New Orleans, La. ....	1880
10th	"	.....Savannah, Ga. ....	1881
11th	"	.....Indianapolis, Ind. ....	1882
12th	"	.....Detroit, Mich. ....	1883
13th	"	.....St. Louis, Mo. ....	1884
14th	"	.....Washington, D. C.....	1885
15th	"	.....Toronto, Ont. ....	1886
16th	"	.....Memphis, Tenn. ....	1887
17th	"	.....Milwaukee, Wis. ....	1888
18th	"	.....Brooklyn, N. Y. ....	1889
19th	"	.....Charleston, S. C. ....	1890
20th	"	.....Kansas City, Mo. ....	1891
21st	"	.....Mexico City, Mex. ....	1892
22d	"	.....Chicago, Ill. ....	1893
23d	"	.....Montreal, Que. ....	1894
24th	"	.....Denver, Colo. ....	1895
25th	"	.....Buffalo, N. Y. ....	1896
26th	"	.....Philadelphia, Pa. ....	1897
27th	"	.....Ottawa, Ont. ....	1898
28th	"	.....Minneapolis, Minn. ....	1899
29th	"	.....Indianapolis, Ind. ....	1900
30th	"	.....Buffalo, N. Y. ....	1901
31st	"	.....New Orleans, La.....	1902
32d	"	.....Washington, D. C. ....	1903
33d	"	.....Havana, Cuba ....	1904
34th	"	.....Boston, Mass. ....	1905
35th	"	.....Mexico City, Mex. ....	1906
36th	"	.....Atlantic City, N. J. ....	1907
37th	"	.....Winnipeg, Man. ....	1908
38th	"	.....Richmond, Va. ....	1909
39th	"	.....Milwaukee, Wis. ....	1910
40th	"	.....Havana, Cuba ....	1911
41st	"	.....Washington, D. C. ....	1912
42d	"	.....Colorado Springs, Colo. ....	1913
43d	"	.....Jacksonville, Fla. ....	1914
44th	"	.....Rochester, N. Y. ....	1915
45th	"	.....Cincinnati, O. ....	1916
46th	"	.....Washington, D. C. ....	1917
47th	"	.....Chicago, Ill. ....	1918
48th	"	.....New Orleans, La. ....	1919
49th	"	.....San Francisco, Calif. ....	1920
50th	"	.....New York, N. Y. ....	1921
51st	"	.....Cleveland, O. ....	1922
52d	"	.....Boston, Mass. ....	1923
53d	"	.....Detroit, Mich. ....	1924
54th	"	.....St. Louis, Mo. ....	1925
55th	"	.....Buffalo, N. Y. ....	1926

## ANNUAL MEETINGS (Cont.)

56th Annual Meeting.....	Cincinnati, O. ....	1927
57th " " .....	Chicago, Ill. ....	1928
58th " " .....	Minneapolis, Minn. ....	1929
59th " " .....	Fort Worth, Tex.* .....	1930
60th " " .....	Montreal, Que. ....	1931
61st " " .....	Washington, D. C. ....	1932
62d " " .....	Indianapolis, Ind. ....	1933
63d " " .....	Pasadena, Calif. ....	1934
64th " " .....	Milwaukee, Wis. ....	1935
65th " " .....	New Orleans, La.† .....	1936
66th " " .....	New York, N. Y. ....	1937
67th " " .....	Kansas City, Mo. ....	1938
68th " " .....	Pittsburgh, Pa. ....	1939
69th " " .....	Detroit, Mich. ....	1940
70th " " .....	Atlantic City, N. J. ....	1941

\* Post-Convention Meeting, Mexico City, Mex., 1930.

† Post-Convention Meeting, Havana, Cuba, 1936.

## PRESIDENTS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

*Stephen Smith, M.D. ....	1872, 1873, 1874	*Domingo Orvananos, M.D. ....	1907
*Joseph M. Toner, M.D. ....	1875	*Richard H. Lewis, M.D. ....	1908
*Edwin M. Snow, M.D. ....	1876	*Gardner T. Swarts, M.D. ....	1909
*John H. Rauch, M.D. ....	1877	*Charles O. Probst, M.D. ....	1910
*Elisha Harris, M.D. ....	1878	R. M. Simpson, M.D. ....	1911
*James L. Cabell, M.D. ....	1879	*J. N. Hurty, M.D. ....	1912
*John S. Billings, M.D. ....	1880	*Rudolph Hering, Sc.D. ....	1913
*Charles B. White, M.D. ....	1881	W. C. Woodward, M.D. ....	1914
*Robert C. Kedzie, M.D. ....	1882	*W. T. Sedgwick, Sc.D. ....	1915
*Ezra M. Hunt, M.D. ....	1883	John F. Anderson, M.D. ....	1916
*Albert L. Gibon, M.D. ....	1884	W. A. Evans, M.D. ....	1917
*James E. Reeves, M.D. ....	1885	*C. J. Hastings, M.D. ....	1918
*Henry P. Walcott, M.D. ....	1886	*Lee K. Frankel, Ph.D. ....	1919
*George M. Sternberg, M.D. ....	1887	W. S. Rankin, M.D. ....	1920
*Charles N. Hewitt, M.D. ....	1888	Mazýck P. Ravenel, M.D. ....	1921
*Hosmer A. Johnson, M.D. ....	1889	A. J. McLaughlin, M.D. ....	1922
*Henry B. Baker, M.D. ....	1890	*E. C. Levy, M.D. ....	1923
*Frederick Montizambert, M.D. ....	1891	*W. H. Park, M.D. ....	1924
*Felix Formento, M.D. ....	1892	Henry F. Vaughan, Dr.P.H. ....	1925
*Samuel H. Durgin, M.D. ....	1893	C.-E. A. Winslow, Dr.P.H. ....	1926
*Emmanuel P. Lachapelle, M.D. ....	1894	*Charles V. Chapin, M.D. ....	1927
*William Bailey, M.D. ....	1895	Herman N. Bundesen, M.D. ....	1928
*Eduardo Liceaga, M.D. ....	1896	*George W. Fuller .....	1929
*Henry B. Horlbeck, M.D. ....	1897	A. J. Chesley, M.D. ....	1930
*Charles A. Lindsey, M.D. ....	1898	Hugh S. Cumming, M.D. ....	1931
*George H. Rohe, M.D. ....	1899	Louis I. Dublin, Ph.D. ....	1932
*Henry Mitchell, M.D. ....	1899	John A. Ferrell, M.D. ....	1933
*Peter H. Bryce, M.D. ....	1900	Haven Emerson, M.D. ....	1934
*Benjamin Lee, M.D. ....	1901	Eugene L. Bishop, M.D. ....	1935
*Henry D. Holton, M.D. ....	1902	Walter H. Brown, M.D. ....	1936
*Walter Wyman, M.D. ....	1903	Thomas Parran, M.D. ....	1937
*Carlos J. Finlay, M.D. ....	1904	Arthur T. McCormack, M.D. ....	1938
*Frank F. Wesbrook, M.D. ....	1905	Abel Wolman, Dr.Eng. ....	1939
*Franklin C. Robinson, LL.D. ....	1906	Edward S. Godfrey, Jr., M.D. ....	1940
		W. S. Leathers, M.D. ....	1941

\* Deceased.

## RECOGNITION FOR EXTENDED MEMBERSHIP

IN 1936 the American Public Health Association established an annual ceremony at which individuals who have held membership for over forty years are presented with an engraved certificate. Listed below are the recipients who have been thus honored. The year each member joined the Association is also indicated.

John Harvey Kellogg, M.D.....	1878	G. Everett Hill .....	1897
Charles V. Chapin, M.D.*.....	1886	Richard N. Connolly, M.D.....	1898
Jesus E. Monjaras, M.D.....	1891	Norman MacL. Harris, M.B.....	1899
Daniel W. Mead, C.E.....	1892	John W. Alvord, C.E.....	1899
Miss Marion Talbot.....	1893	James M. Caird.....	1900
George A. Soper, Ph.D.....	1895	Horatio N. Parker.....	1900
William C. Woodward, M.D.....	1896	George E. Bolling.....	1900
Robert Spurr Weston.....	1896	Frank A. Barbour.....	1900
Mazyck P. Ravenel, M.D.....	1897		

\* Deceased

## RECIPIENTS OF THE SEDGWICK MEMORIAL MEDAL

GRANTED "for distinguished service in public health":

1929 Charles V. Chapin, M.D.*	1936 Frederick F. Russell, M.D.
1930 Theobald Smith, M.D.*	1937 No award
1931 George W. McCoy, M.D.	1938 Wade H. Frost, M.D.*
1932 William H. Park, M.D.*	1939 Thomas Parran, M.D.
1933 Milton J. Rosenau, M.D.	1940 Hans Zinsser, M.D.*
1934 Professor Edwin O. Jordan *	
1935 Haven Emerson, M.D.	

\* Deceased

## EXECUTIVE STAFF

### *Professional Staff*

Reginald M. Atwater, M.D., Executive Secretary, and Managing Editor, *American Journal of Public Health*  
Carl E. Buck, Dr.P.H., Field Director  
Benjamin G. Horning, M.D., Associate Field Director  
Allan A. Twitchell, Technical Secretary, Committee on Hygiene of Housing  
Anatole Solow, Research Assistant, Committee on Hygiene of Housing

### *Secretarial Staff*

Willimina Rayne Walsh, Associate Secretary  
Elsie A. Siemer, Assistant Secretary  
Augusta Jay, Editorial Associate  
Isabel B. Landy, Associate Secretary, Committee on Research and Standards and Committee on Professional Education

Cecile Tonnele, Associate Secretary, Committee on Administrative Practice  
Edith Boyd, Field Secretary  
Lillian Mermin, Assistant Secretary, Committee on Hygiene of Housing

### *Clerical Staff*

Katherine Andrus, Chief Clerk  
Jeanne L. Bickel, Financial Clerk  
Ruth Brown, Senior Clerk  
Mathilda Koschara, Junior Clerk  
Helen Baum, Junior Clerk  
James Moss, Junior Clerk

### *Stenographic Staff*

Beatrice Schott  
Muriel Urell  
Zenna Siegel  
Dorothy M. Morse  
Rita Harrington

## AMERICAN JOURNAL OF PUBLIC HEALTH

### AND THE NATION'S HEALTH

Harry S. Mustard, M.D., *Editor*  
Reginald M. Atwater, M.D., *Managing Editor*  
Leona Baumgartner, M.D., *Associate Editor*

Mazÿck P. Ravenel, M.D., *Editor Emeritus*  
Augusta Jay, *Editorial Associate*  
Arthur P. Miller, C.E., *Associate Editor*

## EDITORIAL BOARD

Reginald M. Atwater, M.D., *Chairman*  
Ira V. Hiscock, Sc.D.  
Kenneth F. Maxcy, M.D.  
Henry E. Meleney, M.D.

## PUBLICATIONS

American Journal of Public Health  
Standard Methods for the Examination of Water and Sewage  
Standard Methods for the Examination of Dairy Products  
Basic Principles of Healthful Housing  
Typhoid Fever, by William Budd  
Panum on Measles  
Appraisal Form for Local Health Work  
A Half Century of Public Health  
The City That Was

Swimming Pools and Other Bathing Places  
Vital Statistics Directory  
Community Organization for Health Education  
Diagnostic Procedures and Reagents  
Control of Communicable Diseases  
Seventh Institute on Public Health Education  
Annual Year Books, 1930-1931 to 1939-1940  
Eleventh Annual Year Book 1940-1941  
Bibliography on Public Health and Allied Subjects

## SECTION COUNCILS

### HEALTH OFFICERS SECTION

(Organized 1908)

- Earle G. Brown, M.D., *Chairman*, West Court House, Old Country Road, Mincola, N. Y.  
Fred Adams, M.B., *Vice-Chairman*, Medical Officer of Health, Windsor, Ont.  
E. R. Coffey, M.D., *Secretary*, U. S. Public Health Service, Washington, D. C.  
Adolph Weinzirl, M.D. (1945)  
Henry F. Vaughan, Dr.P.H. (1944)  
Gregoire F. Amyot, M.D. (1943)  
Edward S. Godfrey, Jr., M.D. (1942)  
John P. Kochler, M.D. (1941)

### LABORATORY SECTION

(Organized 1899)

- Elliott S. Robinson, M.D., *Chairman*, State Department of Public Health, Boston, Mass.  
James Gibbard, *Vice-Chairman*, Department of Pensions and National Health, Ottawa, Ont.  
Edmund K. Kline, Dr.P.H., *Secretary*, Cattaraugus County Department of Health, Olean, N. Y.  
Harold W. Lyall, Ph.D. (1945)  
Thomas F. Sellers, M.D. (1944)  
Friend Lee Mickle, Sc.D. (1943)  
William D. Stovall, M.D. (1942)  
Ruth Gilbert, M.D. (1941)

### VITAL STATISTICS SECTION

(Organized 1908)

- R. N. Whitfield, M.D., *Chairman*, State Department of Health, Jackson, Miss.  
Selwyn D. Collins, Ph.D., *Vice-Chairman*, U. S. Public Health Service, Washington, D. C.  
John Collinson, M.D., *Secretary*, U. S. Bureau of the Census, Washington, D. C.  
A. W. Hedrich, Sc.D. (1945)  
Thomas W. Chamberlain (1944)  
Jessamine S. Whitney (1943)  
J. V. DePorte, Ph.D. (1942)  
George H. Van Buren (1941)  
John T. Marshall (*ex officio*)

### ENGINEERING SECTION

(Organized 1911)

- Harry B. Hommon, *Chairman*, Federal Office Building, San Francisco, Calif.  
James Lloyd Barron, C.E., *Vice-Chairman*, 121 Fulton Avenue, Hempstead, N. Y.  
A. H. Fletcher, *Secretary*, Johns Hopkins University, Baltimore, Md.

Earnest Boyce, C.E. (1945)

Roy J. Morton (1944)

Joel I. Connolly (1943)

Gordon M. Fair (1942)

Arthur P. Miller, C.E. (1941)

### INDUSTRIAL HYGIENE SECTION

(Organized 1914)

- W. J. McConnell, M.D., *Chairman*, 1 Madison Avenue, New York, N. Y.  
William P. Yant, *Vice-Chairman*, Mine Safety Appliances Company, Pittsburgh, Pa.  
J. J. Bloomfield, *Secretary*, National Institute of Health, Bethesda, Md.  
Clarence D. Selby, M.D. (1945)  
Charles L. Pool (1944)  
Leonard Greenburg, M.D. (1943)  
Leverett D. Bristol, M.D. (1942)  
Albert S. Gray, M.D. (1941)

### FOOD AND NUTRITION SECTION

(Organized 1917)

- A. C. Hunter, Ph.D., *Chairman*, U. S. Food and Drug Administration, Washington, D. C.  
Henry T. Scott, Ph.D., *Vice-Chairman*, University of Wisconsin Alumni Research Foundation, Madison, Wis.  
Marietta Eichelberger, Ph.D., *Secretary*, 307 N. Michigan Avenue, Chicago, Ill.  
Donald K. Tressler, Ph.D. (1945)  
Ira A. Manville, M.D. (1944)  
Milton E. Parker (1943)  
Merrill J. Mack (1942)  
Fred W. Tanner, Ph.D. (1941)

### MATERNAL AND CHILD HEALTH SECTION

(Organized 1921)

- Estella F. Warner, M.D., *Chairman*, Box 527, Albuquerque, N. M.  
Charles C. Wilson, M.D., *Vice-Chairman*, 249 High Street, Hartford, Conn.  
Howard B. Mettel, M.D., *Secretary*, State Board of Health, Indianapolis, Ind.  
Edwin F. Daily, M.D. (1945)  
Harold C. Stuart, M.D. (1944)  
Leona Baumgartner, M.D. (1943)  
M. Luise Diez, M.D. (1942)  
Helen A. Cary, M.D. (1941)

### PUBLIC HEALTH EDUCATION SECTION

(Organized 1922)

- Thomas G. Hull, Ph.D., *Chairman*, 535 N. Dearborn Street, Chicago, Ill.

Delbert Oberteuffer, Ph.D., *Vice-Chairman*,  
Ohio State University, Columbus, O.  
Sally Lucas Jean, *Secretary*, 200 Fifth Avenue,  
New York, N. Y.  
Carl A. Wilzbach, M.D. (1945)  
Clair E. Turner, Dr.P.H. (1944)  
Mary P. Connolly (1943)  
Homer N. Calver (1942)  
W. W. Bauer, M.D. (1941)

PUBLIC HEALTH NURSING SECTION  
(Organized 1923)

Ruth Houlton, R.N., *Chairman*, 1790 Broad-  
way, New York, N. Y.  
Laura A. Draper, R.N., *Vice-Chairman*, Com-  
munity Health Service, Minneapolis, Minn.  
Helen Bean, R.N., *Secretary*, Marine Hospital,  
New Orleans, La.

Rena Haig (1945)  
Olive Whitlock, R.N. (1944)  
Bettie W. McDanald (1943)  
Alma C. Haupt, R.N. (1942)  
Elizabeth L. Smellie, R.N. (1941)

EPIDEMIOLOGY SECTION  
(Organized 1929)

John A. Ferrell, M.D., *Chairman*, 49 West  
49th Street, New York, N. Y.  
Alton S. Pope, M.D., *Vice-Chairman*, Depart-  
ment of Public Health, Boston, Mass.  
Ernest L. Stebbins, M.D., *Secretary*, 600  
West 168th Street, New York, N. Y.  
W. Lloyd Aycock, M.D. (1945)  
G. Foard McGinnes, M.D. (1944)  
Carl F. Jordan, M.D. (1943)  
Haven Emerson, M.D. (1942)  
Gaylord W. Anderson, M.D. (1941)

# American Public Health Association Committees

## 1940-1941

### Committee on Eligibility

Don W. Gudakunst, M.D., *Chairman*, 120 Broadway, New York, N. Y. (1941)  
Reginald M. Atwater, M.D., *Secretary*, 1790 Broadway, New York, N. Y.  
Mary V. Dempsey, Vital Statistics Section (1941)  
William B. Grayson, M.D., Health Officers Section (1941)  
Emery R. Hayhurst, M.D., Industrial Hygiene Section (1941)  
Ira V. Hiscock, Sc.D., Public Health Education Section (1942)  
Edmund K. Kline, Dr.P.H., Laboratory Section (1942)  
Agnes J. Martin, R.N., Public Health Nursing Section (1941)  
William B. Palmer, Food and Nutrition Section (1942)  
Milton V. Veldee, M.D., Epidemiology Section (1942)  
Louis F. Warrick, Engineering Section (1942)  
Charles F. Wilinsky, M.D., Maternal and Child Health Section (1941)

### Committee on Administrative Practice

E. L. Bishop, M.D., *Chairman*, Tennessee Valley Authority, Chattanooga, Tenn. (1941)  
Haven Emerson, M.D., *Vice-Chairman* (1941)  
Reginald M. Atwater, M.D., *Secretary*, 1790 Broadway, New York, N. Y.  
Leverett D. Bristol, M.D. (1943)  
Michael M. Davis, Ph.D. (1942)  
A. Grant Fleming, M.D. (1944)  
Kenneth F. Maxcy, M.D., *Chairman*, Committee on Research and Standards (*ex officio*)  
Joseph W. Mountin, M.D. (1942)  
George T. Palmer, Dr.P.H. (1943)  
W. S. Rankin, M.D. (1944)  
Marion W. Sheahan, R.N. (1943)  
Henry F. Vaughan, Dr.P.H. (1944)  
W. F. Walker, Dr.P.H. (1942)  
H. A. Whittaker (1941)

### Representatives from Health Officers Section

W. F. Draper, M.D.  
Robert H. Riley, M.D.  
John J. Sippy, M.D.

#### Consultant

C.-E. A. Winslow, Dr.P.H.

#### Staff

Carl E. Buck, Dr.P.H., *Field Director*, 1790 Broadway, New York, N. Y.  
Benjamin G. Horning, M.D., *Associate Field Director*, 1790 Broadway, New York, N. Y.  
Cecile Tonnele, *Associate Secretary*, 1790 Broadway, New York, N. Y.

### Executive Committee

W. F. Walker, Dr.P.H., *Chairman*, 41 East 57th Street, New York, N. Y.  
Haven Emerson, M.D.  
Joseph W. Mountin, M.D.  
George T. Palmer, Dr.P.H.  
Robert H. Riley, M.D.  
Henry F. Vaughan, Dr.P.H.

Subcommittee on Manual of Practice and Appraisal of Local Health Work  
W. F. Walker, Dr.P.H., *Chairman*, 41 East 57th Street, New York, N. Y.  
Harold D. Chope, M.D.  
Joel I. Connolly  
Martha M. Eliot, M.D.  
Roy J. Morton

Joseph W. Mountin, M.D.  
 John F. Norton, Ph.D.  
 Henry R. O'Brien, M.D.  
 George T. Palmer, Dr.P.H.  
 R. A. Reekie, M.D.  
 W. V. Sanford, M.D.  
 Marion W. Sheahan, R.N.  
 Henry F. Vaughan, Dr.P.H.  
 M. E. Winchester, M.D.

#### Study Committee on Bedside Nursing

Harold D. Chope, M.D., *Chairman*, 55  
 Shattuck St., Boston, Mass.  
 Ruth Houlton, R.N.  
 Sophie C. Nelson, R.N.  
 Marian G. Randall, R.N.  
 Marion W. Sheahan, R.N.

#### Study Committee on Sanitation

H. A. Whittaker, *Chairman*, State Board of  
 Health, Minneapolis, Minn.  
 Alfred H. Fletcher  
 Leslie C. Frank, C.E.  
 H. A. Kroeze  
 F. Gardner Legg  
 Arthur P. Miller, C.E.  
 Roy J. Morton

#### Subcommittee on Health Conservation Contests

Henry F. Vaughan, Dr.P.H., *Chairman*,  
 Commissioner of Health, Detroit, Mich.  
 A. J. Chesley, M.D.  
 Charles L. Christiernin, M.D.  
 T. F. Cunneen  
 George B. Darling, Dr.P.H.  
 Louis I. Dublin, Ph.D.  
 A. Grant Fleming, M.D.  
 M. R. Kinde, M.D.  
 Frank J. Osborne  
 George T. Palmer, Dr.P.H.  
 W. S. Rankin, M.D.  
 John L. Rice, M.D.  
 W. F. Walker, Dr.P.H.

#### Contest Study Committee

Henry F. Vaughan, Dr.P.H., *Chairman*,  
 Commissioner of Health, Detroit, Mich.  
 A. J. Chesley, M.D.  
 George B. Darling, Dr.P.H.  
 A. Grant Fleming, M.D.  
 M. R. Kinde, M.D.  
 Frank J. Osborne  
 George T. Palmer, Dr.P.H.  
 W. F. Walker, Dr.P.H.

#### Contest Grading Committee

W. S. Rankin, M.D., *Chairman*, Power  
 Building, Charlotte, N. C.  
 Henry D. Chadwick, M.D.

A. J. Chesley, M.D.  
 T. F. Cunneen  
 George B. Darling, Dr.P.H.  
 John T. Phair, M.B.  
 W. F. Walker, Dr.P.H.  
 James Wallace, M.D.  
 C.-E. A. Winslow, Dr.P.H.

#### Subcommittee on State Health Adminis- tration

Robert H. Riley, M.D., *Chairman*, State  
 Director of Health, Baltimore, Md.  
 J. N. Baker, M.D.  
 Earle G. Brown, M.D.  
 C. F. Dalton, M.D.  
 W. F. Draper, M.D.  
 Martha M. Eliot, M.D.  
 Donald G. Evans, M.D.  
 Edward S. Godfrey, Jr., M.D.  
 F. W. Jackson, M.D. (Canadian Represen-  
 tative)  
 Arthur T. McCormack, M.D.  
 I. C. Riffin, M.D.  
 W. F. Walker, Dr.P.H.  
 W. C. Williams, M.D.  
 John A. Ferrell, M.D. (*Consultant*)

#### Study Committee to Develop Principles and Criteria for the Allocation of Public Health Funds from the State to the Local Level

Harry S. Mustard, M.D., *Chairman*, 600  
 West 168th Street, New York, N. Y.  
 Jessie M. Bierman, M.D.  
 Bernard W. Carey, M.D.  
 Richard H. Fletcher, M.D.  
 Fred T. Foard, M.D.  
 Franklin M. Foote, M.D.  
 George A. Hays, M.D.  
 Robert H. Hutcheson, M.D.  
 Hugh R. Leavell, M.D.  
 William E. Mosher

#### Subcommittee on Public Health Nursing

Marion W. Sheahan, R.N., *Chairman*, State  
 Department of Health, Albany, N. Y.  
 Dorothy Deming, R.N. (*ex officio*)  
 Naomi Deutsch, R.N. (Alternate—Hor-  
 tense Hilbert, R.N.)  
 Marion Douglas, R.N.  
 Alma C. Haupt, R.N.  
 Ruth Houlton, R.N. (*ex officio*)  
 Pearl McIver, R.N.  
 Sophie C. Nelson, R.N.  
 Olivia Peterson, R.N.  
 Marian G. Randall, R.N.  
 Grace Ross, R.N. (*ex officio*)  
 W. F. Walker, Dr.P.H.  
 Dorothy E. Weisner (*ex officio*)



### Subcommittee on Evaluation of Administrative Practices

Haven Emerson, M.D., *Chairman*, 600 West 168th Street, New York, N. Y.

Allen W. Freeman, M.D.

John E. Gordon, M.D.

Joseph W. Mountin, M.D.

John L. Rice, M.D.

Henry F. Vaughan, Dr.P.H.

W. F. Walker, Dr.P.H.

### *Typhoid Fever*

Orianna MacDaniel, M.D., *Secretary*, State Board of Health, Minneapolis, Minn.

Gaylord W. Anderson, M.D.

Don M. Griswold, M.D.

A. V. Hardy, M.D.

Kenneth F. Maxcy, M.D., *Referee*

Joseph F. Siler, M.D.

### *Measles*

James P. Leake, M.D., *Referee*

Clement A. Silverman, M.D.

Franklin H. Top, M.D.

### *Diphtheria*

V. K. Volk, M.D., *Secretary*, County Health Commission, Saginaw, Mich.

W. E. Bunney, Ph.D.

James A. Doull, M.D.

Donald T. Fraser, M.B.

Martin Frobisher, Jr., Sc.D.

D. Gordon Gill, M.B.

Alexander G. Gilliam, M.D.

Edward S. Godfrey, Jr., M.D., *Referee*

William Grossmann, M.D.

W. T. Harrison, M.D.

G. F. McGinnes, M.D.

Ernest L. Stebbins, M.D.

J. T. Tripp, Ph.D.

### *Whooping Cough*

George McL. Lawson, M.D., *Secretary*, Box 1113, Charlottesville, Va.

James A. Doull, M.D.

F. L. Kelly, M.D.

Pearl L. Kendrick, Sc.D.

J. J. Miller, M.D.

### *Tuberculosis Control Procedures*

Bruce H. Douglas, M.D., *Secretary*, Herman Keifer Hospital, Detroit, Mich.

Herbert R. Edwards, M.D.

Kendall Emerson, M.D.

Esmond R. Long, M.D., *Referee*

Joseph W. Mountin, M.D.

C. R. Reynolds, M.D.

Marion W. Sheahan, R.N.

G. J. Wherrett, M.D.

Jessamine S. Whitney

### *Scarlet Fever*

Gaylord W. Anderson, M.D., *Secretary*, University of Minnesota, Minneapolis, Minn.

Francis Blake, M.D.

Donald T. Fraser, M.B.

John P. Koehler, M.D.

George H. Ramsey, M.D.

Milton V. Veldee, M.D., *Referee*

### *Endemic Goiter*

Frederick B. Miner, M.D., *Secretary*, 400 Sherman Building, Flint, Mich.

George M. Curtis, M.D.

E. B. Hart, Ph.D.

Roy Donaldson McClure, M.D.

Hugh McCullough, M.D.

Bryan Newsom, M.D.

William H. Sebrell, Jr., M.D., *Referee*

Harry A. Towsley, M.D.

W. G. Wilcox

C. C. Young, Dr.P.H.

### *Consultants*

Thomas B. Cooley, M.D.

David J. Levy, M.D.

David Marine, M.D.

J. F. McClendon, Ph.D.

### Subcommittee on Industrial Health Studies

Leverett D. Bristol, M.D., *Chairman*, 195 Broadway, New York, N. Y.

J. J. Bloomfield

G. H. Gehrmann, M.D.

Violet Hodgson

A. J. Lanza, M.D.

Sophie C. Nelson, R.N.

George T. Palmer, Dr.P.H.

W. A. Sawyer, M.D.

E. L. Simonds

J. W. Towson

W. F. Walker, Dr.P.H.

### Subcommittee on Organized Care of the Sick

Joseph W. Mountin, M.D., *Chairman*, U. S. Public Health Service, Washington.

D. C.

Robert C. Hood, M.D.

Henry R. O'Brien, M.D.

George St. J. Perrott

George H. Ramsey, M.D.

Daniel L. Seckinger, M.D.

## Committee on Research and Standards

Kenneth F. Maxcy, M.D., *Chairman*, 615 N. Wolfe Street, Baltimore, Md. (1942)  
 Reginald M. Atwater, M.D., *Secretary*, 1790 Broadway, New York, N. Y.  
 Gaylord W. Anderson, M.D. (1942)  
 Margaret G. Arnstein, R.N. (1943)  
 E. L. Bishop, M.D., *Chairman*, Committee on Administrative Practice (*ex officio*)  
 Richard A. Bolt, M.D. (1943)  
 Halbert L. Dunn, M.D. (1942)  
 Haven Emerson, M.D. (1941)  
 Gordon M. Fair (1942)  
 Walter S. Frisbie (1941)  
 Ira V. Hiscock, Sc.D. (1943)  
 A. Parker Hitchens, M.D. (1943)  
 John F. Norton, Ph.D. (1943)  
 George C. Ruhland, M.D. (1941)  
 Thomas F. Sellers, M.D. (1941)  
 L. R. Thompson, M.D. (1941)  
 Walter von D. Tiedeman, M.C.E. (1942)  
 Abel Wolman, Dr.Eng., *Consultant*  
 Isabel B. Landy, *Associate Secretary*, 1790 Broadway, New York, N. Y.

## Executive Committee

Kenneth F. Maxcy, M.D., *Chairman*, 615  
 N. Wolfe Street, Baltimore, Md.  
 Haven Emerson, M.D.  
 Gordon M. Fair  
 John F. Norton, Ph.D.  
 L. R. Thompson, M.D.

## Subcommittee on the Accuracy of Certified Causes of Death

—————, *Chairman*

Fred L. Adair, M.D.  
 George Baehr, M.D.  
 Selwyn D. Collins, Ph.D.  
 Thomas J. Duffield  
 Halbert L. Dunn, M.D.  
 Haven Emerson, M.D.  
 W. Thurber Fales, Sc.D.  
 John O. Spain  
 George H. Van Buren  
 Jessamine S. Whitney

## Subcommittee on Standard Methods for the Examination of Dishwashing Devices

A. Parker Hitchens, M.D., *Chairman*, University of Pennsylvania, Philadelphia, Pa.  
 Lt. Col. Wesley C. Cox, M.D.  
 James G. Cumming, M.D.  
 James P. Leake, M.D.  
 Commander Charles S. Stephenson, M.D.  
 Raymond V. Stone, D.V.M.

## Subcommittee on Autopsies

Haven Emerson, M.D., *Chairman*, 600 West  
 168th Street, New York, N. Y.  
 Lt. Col. George C. Dunham, M.D.  
 W. Thurber Fales, Sc.D.  
 Harrison S. Martland, M.D.

Paul D. Rosahn, M.D.  
 Milton C. Winternitz, M.D.

## Subcommittee on Communicable Disease Control

Haven Emerson, M.D., *Chairman*, 600 West  
 168th Street, New York, N. Y.  
 James A. Doull, M.D.  
 James P. Leake, M.D.  
 Ralph S. Muckenfuss, M.D.  
 Alton S. Pope, M.D.  
 George H. Ramsey, M.D.  
 Ernest L. Stebbins, M.D.

## Subcommittee on Hygiene of Housing

C.-E. A. Winslow, Dr.P.H., *Chairman*, 310  
 Cedar Street, New Haven, Conn.  
 Rollo H. Britten, *Secretary*, National Institute of Health, Bethesda, Md.  
 Frederick J. Adams  
 F. Stuart Chapin, Ph.D.  
 Joel I. Connolly  
 Robert L. Davison  
 Earle S. Draper  
 James Ford, Ph.D.  
 Greta Gray, Ph.D.  
 James E. Ives, Ph.D.  
 Morton G. Lloyd, Ph.D.  
 Bleecker Marquette  
 George C. Ruhland, M.D.  
 Clarence S. Stein  
 Richard Voell  
 H. A. Whittaker  
 Huntington Williams, M.D.

STAFF, 310 Cedar Street, New Haven,  
 Conn.

Allan A. Twichell, *Technical Secretary*  
 Anatole Solow, *Research Assistant*  
 Lillian Mermin, *Assistant Secretary*

*Executive Committee*

C.-E. A. Winslow, Dr.P.H., *Chairman*,  
310 Cedar Street, New Haven, Conn.  
Frederick J. Adams  
Rollo H. Britten  
Earle S. Draper  
James Ford, Ph.D.  
Morton G. Lloyd, Ph.D.

*Subcommittee on Field Studies*

Robert L. Davison, *Chairman*, 40 East  
40th Street, New York, N. Y.

*Subcommittee on Illumination*

James E. Ives, Ph.D., *Chairman*, U. S.  
Public Health Service, Washington, D. C.

*Subcommittee on Home Sanitation*

H. A. Whittaker, *Chairman*, State Depart-  
ment of Health, Minneapolis, Minn.

*Subcommittee on Recreational Facilities*

Frederick J. Adams, *Chairman*, Massachu-  
setts Institute of Technology, Cambridge,  
Mass.

*Subcommittee on the Effects of Rehousing*

F. Stuart Chapin, Ph.D., *Chairman*, Uni-  
versity of Minnesota, Minneapolis, Minn.

*Joint Subcommittee on Household Opera-  
tion*

Abraham Goldfeld, Ph.D., *Chairman*, Fred  
L. Lavanburg Foundation, New York,  
N. Y.

*Subcommittee on Home Safety*

Rollo H. Britten, *Chairman*, National Insti-  
tute of Health, Bethesda, Md.

*Subcommittee on Housing Codes*

Morton G. Lloyd, Ph.D., *Chairman*, Na-  
tional Bureau of Standards, Washing-  
ton, D. C.

*Subcommittee on Housing Survey Proce-  
dures*

George C. Rubland, M.D., *Chairman*,  
Health Officer, Washington, D. C.

*Subcommittee on Standards of Occupancy*

James Ford, Ph.D., *Chairman*, Harvard  
University, Cambridge, Mass.

**Committee on Professional Education**

William P. Shepard, M.D., *Chairman*, 600 Stockton Street, San Francisco, Calif. (1944)  
Reginald M. Atwater, M.D., *Secretary*, 1790 Broadway, New York, N. Y.  
Allen W. Freeman, M.D. (1942)  
Edward S. Godfrey, Jr., M.D. (1945)  
John E. Gordon, M.D. (1943)  
Ira V. Hiscock, Sc.D. (1945)  
Pearl McIver, R.N. (1941)  
George H. Ramsey, M.D., (1943)  
Wilson G. Smillie, M.D. (1941)  
Ralph E. Tarbett, C.E. (1944)  
Henry F. Vaughan, Dr.P.H. (1942)

*Consultants:*

E. L. Bishop, M.D.  
W. S. Leathers, M.D.  
John Sundwall, M.D.  
Isabel B. Landy, *Associate Secretary*, 1790 Broadway, New York, N. Y.

**Subcommittee on the Educational Quali-  
fications of Professional Personnel in  
Sanitation**

Ralph E. Tarbett, C.E., *Chairman*, U. S.  
Public Health Service, Washington, D. C.  
Herman G. Baity, Sc.D.  
James Lloyd Barron, C.E.  
Earnest Boyce, C.E.  
Prof. Charles G. Hyde  
Arthur P. Miller, C.E.

**Subcommittee on the Educational Quali-  
fications of Health Officers**

Allen W. Freeman, M.D., *Chairman*, 615  
N. Wolfe Street, Baltimore, Md.  
John E. Gordon, M.D.  
Ira V. Hiscock, Sc.D.  
Henry E. Meleney, M.D.  
George H. Ramsey, M.D.  
Wilson G. Smillie, M.D.  
Henry F. Vaughan, Dr.P.H.

**Subcommittee on the Educational Qualifications of Health Educators**

*Subcommittee A—Educational Qualifications of School Health Educators*

John Sundwall, M.D., *Chairman*, University of Michigan, Ann Harbor, Mich.

Edna A. Gerken, C.P.H.

Earl E. Kleinschmidt, M.D.

Anita Laton, Ph.D.

Harold H. Mitchell, M.D.

James F. Rogers, M.D.

Clair E. Turner, Dr.P.H.

*Subcommittee B—Educational Qualifications of Adult Health Educators*

John Sundwall, M.D., *Chairman*, University of Michigan, Ann Arbor, Mich.

W. W. Bauer, M.D.

Mary P. Connolly

Edna A. Gerken, C.P.H.

Ruth E. Grout, Ph.D.

Ira V. Hiscock, Sc.D.

Mabel E. Rugen, Ph.D.

Clair E. Turner, Dr.P.H.

**Subcommittee on the Educational Qualifications of Public Health Nurses**

Pearl McIver, R.N., *Chairman*, U. S. Public Health Service, Washington, D. C.

Ellen L. Buell, R.N.

Mary C. Connor, R.N.

Ruth W. Hubbard, R.N.

George H. Ramsey, M.D.

Wilson G. Smillie, M.D.

Katharine Tucker, R.N.

**Subcommittee on Education of Undergraduates in Preventive Medicine**

Wilson G. Smillie, M.D., *Chairman*, 1300 York Avenue, New York, N. Y.

John E. Gordon, M.D.

Alan Gregg, M.D.

W. S. Leathers, M.D.

Kenneth F. Maxcy, M.D.

Henry E. Meleney, M.D.

**Subcommittee on the Educational Qualifications of Public Health Nutritionists**

Pearl McIver, R.N., *Chairman*, U. S. Public Health Service, Washington, D. C.

J. N. Baker, M.D.

Alice F. Blood, Ph.D.

Blanche Dimond

Marjorie M. Heseltine

Martha Koehne, Ph.D.

Lydia J. Roberts, Ph.D.

W. H. Sebrell, Jr., M.D.

**Subcommittee on the Educational Qualifications of Laboratory Personnel**

William D. Stovall, M.D., *Chairman*, State Laboratory of Hygiene, Madison, Wis.

Julia M. Coffey

John E. Gordon, M.D.

Lucy Heathman, M.D.

C. A. Perry, Sc.D.

H. J. Shaughnessy, Ph.D.

**Subcommittee on the Educational Qualifications of Public Health Statisticians**

John Sundwall, M.D., *Chairman*, University of Michigan, Ann Arbor, Mich.

Halbert L. Dunn, M.D.

Gaius E. Harmon, M.D.

A. W. Hedrich, Sc.D.

George St. J. Perrott

**Subcommittee on the Educational Qualifications of Industrial Hygienists**

Henry F. Vaughan, Dr.P.H., *Chairman*, Commissioner of Health, Detroit, Mich.

Leverett D. Bristol, M.D.

Philip Drinker

T. Lyle Hazlett, M.D.

Paul A. Neal, M.D.

Clarence D. Selby, M.D.

**Subcommittee on the Educational Qualifications of Tuberculosis Directors**

Henry F. Vaughan, Dr.P.H., *Chairman*, Commissioner of Health, Detroit, Mich.

**Subcommittee on the Educational Qualifications of Crippled Children Specialists**

Henry F. Vaughan, Dr.P.H., *Chairman*, Commissioner of Health, Detroit, Mich.

**Subcommittee on the Educational Qualifications of Maternal and Child Health Specialists**

Ira V. Hiscock, Sc.D., *Chairman*, 310 Cedar Street, New Haven, Conn.

Jessie M. Bierman, M.D.

Amos Christie, M.D.

Hazel Corbin

Hugh R. Leavell, M.D.

Albert McCown, M.D.

**Subcommittee on the Educational Qualifications of Mental Hygienists**

Ira V. Hiscock, Sc.D., *Chairman*, 310 Cedar Street, New Haven, Conn.

Clara Bassett

James S. Cunningham, M.D.

Franklin G. Ebaugh, M.D.

Charles E. Shepard, M.D.

George S. Stevenson, M.D.

**Subcommittee on the Educational Qualifications of Cancer Specialists**

Ira V. Hiscock, Sc.D., *Chairman*, 310 Cedar Street, New Haven, Conn.

Charles L. Larkin, M.D.

Herbert L. Lombard, M.D.

Leonard A. Scheele, M.D.

**Subcommittee on the Educational Qualifications of Venereal Disease Control Officers**

Edward S. Godfrey, Jr., M.D., *Chairman*, Commissioner of Health, Albany, N. Y.

William A. Brumfield, Jr., M.D.

Harold D. Chope, M.D.

Thomas B. Turner, M.D.

Raymond A. Vonderlehr, M.D.

**Subcommittee on the Educational Qualifications of Public Health Dentists**

John Sundwall, M.D., *Chairman*, University of Michigan, Ann Arbor, Mich.

**Subcommittee on the Educational Qualifications of Pneumonia Control Officers**

Edward S. Godfrey, Jr., M.D., *Chairman*, Commissioner of Health, Albany, N. Y.

Gaylord W. Anderson, M.D.

Maxwell Finland, M.D.

Edward S. Rogers, M.D.

Adolph Rumreich, M.D.

Herman G. Weiskotten, M.D.

**Subcommittee on Merit Systems**

Reginald M. Atwater, M.D., *Chairman*, 1790 Broadway, New York, N. Y.

Martha L. Clifford, M.D.

Dorothy Deming, R.N.

Alfred H. Fletcher

George H. Ramsey, M.D.

W. F. Walker, Dr.P.H.

**Subcommittee on Field Experience Centers**

Wilson G. Smillie, M.D., *Chairman*, 1300 York Avenue, New York, N. Y.

E. L. Bishop, M.D.

George B. Darling, Dr.P.H.

Pearl McIver, R.N.

Roy J. Morton

Robert H. Riley, M.D.

**Consultants:**

Edward S. Godfrey, Jr., M.D.

John E. Gordon, M.D.

**Editorial Committee**

Henry F. Vaughan, Dr.P.H., *Chairman*, Commissioner of Health, Detroit, Mich.

Allen W. Freeman, M.D.

George H. Ramsey, M.D.

**Association Committees****Association Nominating Committee for Governing Council Members**

Huntington Williams, M.D., *Chairman*, Commissioner of Health, Baltimore, Md.

Leverett D. Bristol, M.D., Industrial Hygiene Section

Walter H. Brown, M.D., Maternal and Child Health Section

Marjorie Delavan, Public Health Education Section

Joseph A. Kasper, M.D., Laboratory Section

Henry M. Loomis, Food and Nutrition Section

Sol Pincus, C.E., Engineering Section

Marian G. Randall, R.N., Public Health Nursing Section

Clarence L. Scamman, M.D., Epidemiology Section

Noble A. Upchurch, M.D., Health Officers Section

Jessamine S. Whitney, Vital Statistics Section

**Committee on Constitution and By-Laws**

Henry F. Vaughan, Dr.P.H., *Chairman*, Commissioner of Health, Detroit, Mich.

Haven Emerson, M.D.

Edward S. Godfrey, Jr., M.D.

W. S. Rankin, M.D.

**Committee on Public Health and the National Defense**

W. S. Leathers, M.D., *Chairman*, Vanderbilt University, Nashville, Tenn.

Stanley H. Osborn, M.D.

John L. Rice, M.D.

Huntington Williams, M.D.

Abel Wolman, Dr.Eng.

Reginald M. Atwater, M.D. (*ex. officio*)

**Program Committee**

Reginald M. Atwater, M.D., *Chairman*, 1790 Broadway, New York, N. Y.

Helen Bean, R.N.

J. J. Bloomfield

Frank G. Boudreau, M.D.

Carl E. Buck, Dr.P.H.  
 Alfred L. Burgdorf, M.D.  
 L. Van D. Chandler  
 E. R. Coffey, M.D.  
 John Collinson, M.D.  
 E. G. Eggert  
 Marietta Eichelberger, Ph.D.  
 Alfred H. Fletcher  
 Selskar Gunn  
 John Hall  
 Ira V. Hiscock, Sc.D.  
 Sally Lucas Jean  
 Edmund K. Kline, Dr.P.H.  
 Howard B. Mettel, M.D.  
 James E. Perkins, M.D.  
 George H. Ramsey, M.D.  
 S. L. Salasin, M.D.  
 Ernest L. Stebbins, M.D.  
 W. F. Walker, Dr.P.H.

#### Committee on American Museum of Hygiene

Louis I. Dublin, Ph.D., *Chairman*, 1 Madison Avenue, New York, N. Y.  
 Homer N. Calver, *Secretary*, 1790 Broadway, New York, N. Y.  
 Bertrand Brown  
 James A. Doull, M.D.  
 Kendall Emerson, M.D.  
 Bruno Gebhard, M.D.  
 Victor G. Heiser, M.D.  
 Sally Lucas Jean  
 Guy S. Millberry, D.D.S.

#### Sedgwick Memorial Medal Committee

Thomas Parran, M.D., *Chairman*, Surgeon-General, U. S. Public Health Service, Washington, D. C.  
 Haven Emerson, M.D.  
 George W. McCoy, M.D.  
 Milton J. Rosenau, M.D.  
 Frederick F. Russell, M.D.

#### Scientific Exhibits Committee

Homer N. Calver, *Chairman*, 1790 Broadway, New York, N. Y.  
 Reginald M. Atwater, M.D.  
 Bruno Gebhard, M.D.  
 John Hall  
 H. E. Kleinschmidt, M.D.  
 Dorothy B. Nyswander, Ph.D.  
 Milton Rose, M.D.  
 Robert B. T. Schmuck  
 Wilson G. Smillie, M.D.

#### Committee to Study the Creation of a Section on School Health

George T. Palmer, Dr.P.H., *Chairman*, Department of Health, New York, N. Y.  
 Amos L. Beaghler, M.D.  
 Jessie M. Bierman, M.D.  
 Don W. Gudakunst, M.D.  
 Harold H. Mitchell, M.D.  
 Dorothy B. Nyswander, Ph.D.  
 Charles C. Wilson, M.D.

## SECTION COMMITTEES

### Engineering Section

#### Committee on Bathing Places (Joint with Conference of State Sanitary Engineers) (allocated to Committee on Research and Standards)

Warren J. Scott, *Chairman*, 34 Garfield Road, West Hartford, Conn.  
 Bernard P. Domogalla, Ph.D.  
 Chauncey A. Hyatt  
 Thomas M. Riddick

#### *Advisers*

*Epidemiology Section*  
 Lloyd Arnold, M.D.

*Laboratory Section*  
 Walter L. Mallmann, Ph.D.

#### Committee on Coördination of Public Health Engineering Activities (unallocated)

Roy J. Morton, *Chairman*, Vanderbilt University, Nashville, Tenn.

Herman G. Baity, Sc.D.  
 Gordon M. Fair  
 Alfred H. Fletcher  
 H. A. Kroeze  
 Warren J. Scott  
 Harold A. Young

#### *Advisers*

*Health Officers Section*  
 R. H. Markwith, M.D.  
 William P. Richardson, M.D.

#### Committee on Disinfection of Dishes and Utensils (allocated to Committee on Research and Standards)

Walter von D. Tiedeman, M.C.E., *Chairman*, State Department of Health, Albany, N. Y.  
 F. Clarke Dugan, C.E.  
 A. W. Fuchs  
 William T. Ingram  
 Herbert H. Wagenhals, Ph.B.

**Committee on Waterways Pollution**  
(allocated to Committee on Research and Standards)

Carl E. Green, C.E., *Chairman*, 816 Oregon Building, Portland, Ore.

Maurice LeBosquet, Jr.

E. S. Tisdale

F. Holman Waring

Louis F. Warrick, Ch.E.

Ben L. Williamson

*Advisers*

*Epidemiology Section*

Milton V. Veldee, M.D.

*Laboratory Section*

M. Starr Nichols, Ph.D.

**Committee on Ground Water Pollution**  
(allocated to Committee on Research and Standards)

H. E. Miller, *Chairman*, University of Michigan, Ann Arbor, Mich.

**Committee on Industrial Sanitation**  
(unallocated)

W. Scott Johnson, *Chairman*, State Board of Health, Jefferson City, Mo.

Roy M. Harris, C.E.

A. H. Wieters

Alexander H. Zimmerman, Ch.E.

**Committee on Municipal Public Health Engineering** (unallocated)

Sol Pincus, C.E., *Chairman*, Department of Health, New York, N. Y.

James Lloyd Barron, C.E.

Joel I. Connolly

Aimé Cousineau, C.E.

Charles M. Davidson

Alfred H. Fletcher

Arthur E. Gorman

Graham M. Hatch, Jr.

William T. Ingram

F. Gardner Legg

**Committee on Plumbing** (Joint with Conference of State Sanitary Engineers) (allocated to Committee on Research and Standards)

Joel I. Connolly, *Chairman*, Board of Health, Chicago, Ill.

Harold E. Babbitt

Thomas R. Camp

Francis M. Dawson, M.C.E.

**Committee on Sewage Disposal** (allocated to Committee on Research and Standards)

Langdon Pearse, *Chairman*, P. O. Drawer F, Winnetka, Ill.

Don E. Bloodgood, C.E.

Almon L. Fales

C. G. Gillespie

Clarence E. Keefer

Robert W. Kehr, C.E.

Theodore J. Lafreniere, C.E.

Floyd W. Mohlman, Ph.D.

Willem Rudolfs, Ph.D.

Francis M. Veatch

P. J. Alwin Zeller

**Committee on Water Supply** (allocated to Committee on Research and Standards)

Anselmo F. Dappert, *Chairman*, State Department of Health, Albany, N. Y.

H. J. Darcey

Arthur E. Gorman

Raymond F. Goudey

Graham M. Hatch, Jr.

L. L. Hedgepeth

Harold Stephens Hutton, C.E.

Clarence W. Klassen

Arthur D. Weston

**Committee on Shellfish** (allocated to Committee on Research and Standards)

L. M. Fisher, C.E., *Chairman*, U. S. Public Health Service, Washington, D. C.

Milton H. Bidwell

Joseph B. Glancy

George L. Hall

Roy M. Harris, C.E.

Richard Messer

Sol Pincus, C.E.

Ralph E. Tarbett, C.E.

Edward Wright

*Adviser*

*Laboratory Section*

Chester T. Butterfield

## Epidemiology Section

**Committee on Bathing Places** (to cooperate with the Committee on Bathing Places of the Engineering Section)

Lloyd Arnold, M.D.

**Committee on Waterways Pollution** (to cooperate with the Committee on Waterways Pollution of the Engineering Section)

Milton V. Veldee, M.D.

## Laboratory Section

**Coördinating Committee on Standard Methods** (allocated to Committee on Research and Standards)

A. Parker Hitchens, M.D., *Chairman*, University of Pennsylvania, Philadelphia, Pa.

Robert S. Breed, Ph.D.

James Gibbard

R. A. Kelsner, Ph.D.

Walter L. Mallmann, Ph.D.

Friend Lee Mickle, Sc.D.

Elliott S. Robinson, M.D.

William D. Stovall, M.D.

Edmund K. Kline, Dr.P.H. (*ex officio*)  
*Secretary*, Cattaraugus County Department of Health, Olean, N. Y.

**Standard Methods Committee on Diagnostic Procedures and Reagents**

William D. Stovall, M.D., *Chairman*, State Laboratory of Hygiene, Madison, Wis.

*Referee*<sup>1</sup> for:

Gonorrhea and the Gonococcus—Charles M. Carpenter, M.D., University of Rochester, Rochester, N. Y.

Laboratory Diagnosis of Diphtheria—Martin Frobisher, Jr., D.Sc., Johns Hopkins University, Baltimore, Md.

Laboratory Diagnosis of Rabies—Thomas F. Sellers, M.D., State Board of Health, Atlanta, Ga.

Laboratory Diagnostic Procedures in the Recognition of Various Food Poisonings—S. A. Koser, Ph.D., University of Chicago, Chicago, Ill.

Laboratory Methods for the Diagnosis of Fungus Diseases—William D. Stovall, M.D., State Laboratory of Hygiene, Madison, Wis.

Meningitis and Meningococcus—Sara E. Branham, M.D., National Institute of Health, Bethesda, Md.

Recognition and Significance of Hemolytic Streptococci in Infectious Diseases—Julia M. Coffey, State Department of Health, Albany, N. Y.

Recognition of Pneumococcus Types Associated with Pneumonia—Wheeler D. Sutliff, M.D., Department of Health Laboratories, New York, N. Y.

Serological and Bacteriological Procedures in the Diagnosis of Enteric Fevers—Marion B. Coleman, State Department of Health, Albany, N. Y.

Serological, Bacteriological and Other Biological Procedures in the Diagnosis of Undulant Fever—A. Parker Hitchens, M.D., University of Pennsylvania, Philadelphia, Pa.

Serological Tests for the Diagnosis of Syphilis—Ruth Gilbert, M.D., State Department of Health, Albany, N. Y.

Studies on the Toxicity of Dyes for Bacteria—Edmund K. Kline, Dr.P.H., Cattaraugus County Department of Health, Olean, N. Y.

Tuberculosis and the Tubercle Bacillus—A. L. MacNabb, D.V.M., Department of Health, Toronto, Ont.

Tularemia and Bacterium Tularensis—Typhus Fever and Laboratory Methods for Its Recognition—Henry Welch, Ph.D., U. S. Food and Drug Administration, Washington, D. C.

Whooping Cough and B. Pertussis—Pearl L. Kendrick, Sc.D., State Department of Health, Grand Rapids, Mich.

*Associate Referee*<sup>2</sup> for:

Complement-Fixation Test for Syphilis—Elizabeth Maltaner, State Department of Health, Albany, N. Y.

Laboratory Diagnosis of Diphtheria—Donald T. Fraser, M.B., University of Toronto, Toronto, Ont.

Laboratory Diagnosis of Rabies—Harry Carnes, State Department of Health, Atlanta, Ga.

Laboratory Methods for the Diagnosis of Fungus Diseases—Lois Almon, Ph.D., State Laboratory of Hygiene, Madison, Wis.

Serological, Bacteriological and Other Biological Procedures in the Diagnosis of Undulant Fever—Frances Sullivan, University of Pennsylvania, Philadelphia, Pa.

Studies on the Toxicity of Dyes for Bacteria—Cassandra Ritter, Water and Sewage Laboratory, University of Kansas, Lawrence, Kans.

Tuberculosis and the Tubercle Bacillus—M. H. Brown, M.D., University of Toronto, Toronto, Ont.

Tularemia and Bacterium Tularensis—George D. Brigham, Ph.D., U. S. Quarantine Station, Mobile, Ala.

Whooping Cough and B. Pertussis—George McL. Lawson, M.D., Box 1113, Charlottesville, Va., and J. J. Miller, Jr., M.D., 2398 Sacramento Street, San Francisco, Calif.

<sup>1</sup> Referees are members of the Standard Methods Committee upon which they serve.

<sup>2</sup> Associate Referees are not members of the Standard Methods Committee upon which they serve.



### Standard Methods Committee on Examination of Water and Sewage

Walter L. Mallmann, Ph.D., *Chairman*,  
Michigan State College, East Lansing,  
Mich.

#### Referee<sup>1</sup> for:

Bacteriological Methods for Water—Mac  
H. McCrady, 89 Notre Dame East,  
Montreal, Que.

Chemical Methods for Water—A. M.  
Buswell, Ph.D., Water Survey, 57  
Chemical Building, Urbana, Ill., and S.  
T. Powell, State Department of Health,  
Baltimore, Md.

Chemical Methods of Sewage—F. Wellin-  
ton Gilcreas, State Department of  
Health, Albany, N. Y.

Coliform Group Variants—Leland W.  
Parr, Ph.D., George Washington Uni-  
versity, Washington, D. C.

Microscopic Methods of Water—Theodore  
A. Olson, State Department of Health,  
Minneapolis, Minn.

Swimming Pool and Bathing Place Waters  
—Walter L. Mallmann, Ph.D., Michi-  
gan State College, East Lansing, Mich.

Waterways Pollution—M. Starr Nichols,  
Ph.D., State Laboratory of Hygiene,  
Madison, Wis.

### Joint Editorial Committee for Standard Methods for the Examination of Water and Sewage

John F. Norton, Ph.D., *Chairman*, 301  
Henrietta Street, Kalamazoo, Mich.

A. M. Buswell, Ph.D., Water Survey, 57  
Chemical Building, Urbana, Ill.

W. D. Hatfield, Ph.D., 249 Linden Place,  
Decatur, Ill.

H. A. Leverin, B.Sc., Bureau of Mines,  
Ottawa, Ont.

Walter L. Mallmann, Ph.D., Michigan State  
College, East Lansing, Mich.

M. C. Swartz, Ph.D., Louisiana State Uni-  
versity, University, La.

### Standard Methods Committee on Examination of Dairy Products

Robert S. Breed, Ph.D., *Chairman*, Box  
353, Geneva, N. Y.

#### Referee<sup>1</sup> for:

Chemical Methods of Examining Dairy  
Products—Walter S. Frisbie, Food and

Drug Administration, U. S. Depart-  
ment of Agriculture, Washington, D. C.  
Comparative Tests of Agar Media for  
Standard Milk Work—S. R. Damon,  
Ph.D., Director of Laboratories, State  
Board of Health, Montgomery, Ala.

Laboratory Equipment — Raymond V.  
Stone, D.V.M., 829 So. 6th Street,  
Alhambra, Calif.

Methods for Detecting Organisms of the  
Colon Group, A. J. Slack, M.D., Insti-  
tute of Public Health, London, Ont.

Methods of Counting Bacteria in Dairy  
Products—A. H. Robertson, Ph.D.,  
State Department of Agriculture and  
Markets, Albany, N. Y.

Methods of Isolating Specific Types of  
Bacteria in Dairy Products—Mac H.  
McCrady, 89 Notre Dame East, Mon-  
treal, Que.

Tests for the Sterility of Dairy Utensils—  
Walter von D. Tiedeman, M.C.E., Chief,  
Bureau of Milk Sanitation, State De-  
partment of Health, Albany, N. Y.

#### Associate Referee<sup>2</sup> for:

Bacteriological Methods of Examining  
Ice Cream—F. W. Fabian, Ph.D.,  
Michigan State College, East Lansing,  
Mich.

Methods of Examining Milk for Evidences  
of Brucella Infection—I. F. Huddleson,  
Ph.D., Michigan State College, East  
Lansing, Mich.

Methods of Examining Milk for Tubercle  
Bacilli—William A. Hagan, D.V.M.,  
State Veterinary College, Cornell Uni-  
versity, Ithaca, N. Y.

Methods of Identifying Streptococci in  
Dairy Products—George J. Hucker,  
Ph.D., New York State Agricultural  
Experiment Station, Geneva, N. Y.

Methylene Blue Reductase Test—H. R.  
Thornton, Ph.D., University of Alberta,  
Edmonton, Alta.

Microbiological Methods for Examining  
Butter—E. H. Parfitt, Ph.D., Purdue  
University, Lafayette, Ind.

Milk Sediment Test—Caryl C. Carson,  
State Department of Health Labora-  
tory, Hartford, Conn.

Phosphatase Test—J. H. Shrader, Ph.D.,  
Eastern Nazarene College, Wollaston,  
Mass.

### Joint Editorial Committee for Standard Methods for the Examination of Dairy Products

Robert S. Breed, Ph.D., *Chairman*, Box  
353, Geneva, N. Y.

<sup>1</sup> Referees are members of the Standard Methods Committee upon which they serve.

<sup>2</sup> Associate Referees are not members of the Standard Methods Committee upon which they serve.

E. M. Bailey, Ph.D., New Haven Agricultural Experiment Station, New Haven, Conn.

Friend Lee Mickle, Sc.D., State Department of Health, Hartford, Conn.

Henry T. Scott, Ph.D., Wisconsin Alumni Research Foundation, Madison, Wis.

#### Standard Methods Committee on Biology of the Laboratory Animal

R. A. Kelsner, Ph.D., *Chairman*, Veterinary Corps, U. S. Army, Washington, D. C.

##### *Associate Referees*<sup>2</sup>

Arthur M. Cloudman, Ph.D., Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me.

R. G. Daggs, Ph.D., University of Vermont, Burlington, Vt.

Ralph W. Mohri, D.V.M., Army Medical Center, Washington, D. C.

Paul A. Moody, Ph.D., University of Vermont, Burlington, Vt.

Gregory Pincus, D.Sc., Biological Laboratories, Clark University, Worcester, Mass.

Norman J. Pyle, V.M.D., 195 N. Middletown Road, Pearl River, N. Y.

Paul B. Swain, Sc.D., Brown University, Providence, R. I.

George B. Wislocki, M.D., Harvard University Medical School, Boston, Mass.

#### Standard Methods Committee on Analyzing Frozen Desserts and Ingredients (Joint with the Committee of the Food and Nutrition Section)

Friend Lee Mickle, Sc.D., *Chairman*, State Department of Health, Hartford, Conn.

James Gibbard, Department of Pensions and National Health, Ottawa, Ont.

##### *Referee*<sup>1</sup> *for:*

Chemical Analysis of Frozen Desserts and Ingredients—J. H. Shrader, Ph.D., Eastern Nazarene College, Wollaston, Mass.

Microbiological Examination of Frozen Desserts—A. H. Robertson, Ph.D., State Department of Agriculture and Markets, Albany, N. Y.

Microbiological Examination of Ingredients—F. W. Fabian, Ph.D., Michigan State College, East Lansing, Mich.

Sediment Testing of Frozen Desserts and Ingredients—Milton E. Parker, 1526 S. State Street, Chicago, Ill.

##### *Associate Referee*<sup>2</sup> *for:*

Chemical Determinations of Acidity in Frozen Desserts—H. H. Sommer, University of Wisconsin, Madison, Wis.

Chemical Determinations of Milk Solids in Frozen Desserts—O. A. Ghiggoile, State Department of Agriculture, Sacramento, Calif.

Chemical Determinations of Modified Babcock Methods for Frozen Desserts—W. H. Martin, Kansas State College, Manhattan, Kans.

Chemical Determinations for Phosphatase Test for Frozen Desserts—George Jaggard, 1037 Park Avenue, Collingswood, N. J.

Chemical Determinations of Stabilizers in Frozen Desserts—F. Leslie Hart, U. S. Food and Drug Administration, San Francisco, Calif.

Microbiological Examination of Condensed and Evaporated Milk—Paul A. Downs, Ph.D., University of Nebraska, Lincoln, Nebr.

Microbiological Examination of Dry Milk—Paul S. Prickett, Ph.D., Evansville, Ind.

Microbiological Examination of Eggs—Roy Schneider, Food Division, U. S. Food and Drug Administration, Washington, D. C.

Microbiological Examination of Flavors, Colors, Fruits and Nuts—M. J. Prucha, Ph.D., University of Illinois, Urbana, Ill.

Microbiological Examination of Sugar—H. H. Hall, U. S. Department of Agriculture, Washington, D. C.

Sampling for Chemical Determinations—P. H. Tracy, Ph.D., University of Illinois, Urbana, Ill.

Sediment Testing of Concentrated and Dried Milks—E. C. Thompson, Ph.D., 350 Madison Avenue, New York, N. Y.

Sediment Testing of Egg Products—Bernard E. Proctor, Ph.D., Massachusetts Institute of Technology, Cambridge, Mass.

#### Standard Methods Committee on Biological Products

Elliott S. Robinson, M.D., *Chairman*, State Department of Health, Boston, Mass.

Robert D. Defries, M.D., 5 Cluny Drive, Toronto, Ont.

Ralph S. Muckenfuss, M.D., Bureau of

<sup>1</sup> Referees are members of the Standard Methods Committee upon which they serve.

<sup>2</sup> Associate Referees are not members of the Standard Methods Committee upon which they serve.

Laboratories, Department of Health, New York, N. Y.

Milton V. Veldee, M.D., National Institute of Health, Bethesda, Md.

#### Standard Methods Committee for the Examination of Shellfish

James Gibbard, *Chairman*, Department of Pensions and National Health, Ottawa, Ont.

C. T. Butterfield, Principal Bacteriologist, U. S. Public Health Service, Cincinnati, O.

Hazel M. Hatfield, M.D., Department of Health, New York, N. Y.

A. Parker Hitchens, M.D., Medical School, University of Pennsylvania, Philadelphia, Pa.

A. C. Hunter, Ph.D., Food and Drug Administration, U. S. Department of Agriculture, Washington, D. C.

C. B. Kelly, Jr., New York State Conservation Department, Freeport, N. Y.

C. A. Perry, Sc.D., State Department of Health, Baltimore, Md.

F. W. Tanner, Ph.D., University of Illinois, Urbana, Ill.

#### Laboratory Section Representative on the Commission for the Study of Biological Stains

William D. Stovall, M.D., State Laboratory of Hygiene, Madison, Wis.

### Vital Statistics Section

#### Committee on Accident Statistics (allocated to Committee on Administrative Practice)

Robert J. Vane, *Chairman*, 1 Madison Avenue, New York, N. Y.

Earle G. Brown, M.D.

J. V. DePorte, Ph.D.

Halbert L. Dunn, M.D.

W. Thurber Fales, Sc.D.

George H. Van Buren

#### *Consultants*

Joseph M. Dalla Valle, Sc.D.

W. G. Johnson

#### Committee on Forms and Methods of Statistical Practice (allocated to Committee on Administrative Practice)

A. W. Hedrich, Sc.D., *Chairman*, State Department of Health, Baltimore, Md.

Selwyn D. Collins, Ph.D.

John Collinson, M.D.

Halbert L. Dunn, M.D.

W. Thurber Fales, Sc.D.

Joseph B. Irvine, LL.M.

Margaret Merrell, Sc.D.

Elizabeth Parkhurst

Elizabeth J. Steele

#### Committee on Utilization of Vital Statistics Data During the 1940 Census Period (unallocated)

W. Thurber Fales, Sc.D., *Chairman*, Department of Health, Baltimore, Md.

J. V. DePorte, Ph.D.

Forrest E. Linder, Ph.D.

Alfred J. Lotka, D.Sc.

Hugo Muench, Jr., M.D.

Ruth R. Puffer

George H. Ramsey, M.D.

Jessamine S. Whitney

#### Committee on Membership (unallocated)

Jessamine S. Whitney, *Chairman*, 1790 Broadway, New York, N. Y.

Louis Feldman

Willard C. Smith

#### Committee for the Study of Methods of Estimating Population (unallocated)

J. V. DePorte, Ph.D., *Chairman*, State Department of Health, Albany, N. Y.

Thomas W. Chamberlain

Emery M. Foster

Frank Lorimer

Charles L. Mosher, Ph.B.

Lowell J. Reed, Ph.D.

Henry S. Shryock, Jr., Ph.D.

Conrad Tacuber, Ph.D.

Leon E. Truesdell, Ph.D.

Robert G. Webster

#### Committee on Master Plans for WPA Projects (unallocated)

Halbert L. Dunn, M.D., *Chairman*, Bureau of the Census, Washington, D. C.

A. W. Hedrich, Sc.D.

Hugo Muench, Jr., M.D.

Jessamine S. Whitney

#### Committee on Universal Registration To be appointed

## Food and Nutrition Section

**Committee on Microbiological Examination of Foods** (allocated to Committee on Research and Standards)

Harry E. Goresline, Ph.D., *Chairman*, U. S. Department of Agriculture, Washington, D. C.

M. T. Bartram, Ph.D.

James A. Berry

Edwin J. Cameron, Ph.D.

James E. Fuller, Ph.D.

M. E. Highlands

Carl S. Pederson, Ph.D.

Paul S. Prickett, Ph.D.

Nathan H. Sanderson, Jr.

John M. Sharf

Evan Wheaton, Ph.D.

Oscar B. Williams, Ph.D.

Frank L. Gunderson, Ph.D.

Lloyd B. Jensen, Ph.D.

Margaret C. Moore

Ole Salthe

Fred W. Tanner, Ph.D.

Julian H. Toulouse, Ph.D.

Donald K. Tressler, Ph.D.

Harry W. von Loesecke

**Committee on Food Utensil Sanitation** (allocated to Committee on Research and Standards)

George J. Hucker, Ph.D., *Chairman*, New York State Agricultural Experiment Station, Geneva, N. Y.

Cecil G. Dunn, Ph.D.

Ferdinand A. Korff

C. S. Ladd

J. Raymond Sanborn, Ph.D.

**Committee on Milk and Dairy Products** (allocated to Committee on Research and Standards)

Merrill J. Mack, *Chairman*, Massachusetts State College, Amherst, Mass.

J. O. Clarke

Paul A. Downs, Ph.D.

Marietta Eichelberger, Ph.D.

George W. Grim, V.M.D.

J. A. Keenan, Ph.D.

William B. Palmer

Horatio N. Parker

Rachael L. Reed

Walter W. Scofield

**Joint Committee on Analyzing Frozen Desserts** (Joint with the Committee of the Laboratory Section) (allocated to Committee on Research and Standards)

Frederick W. Fabian, Ph.D., *Chairman*, Michigan State College, East Lansing, Mich.

Milton E. Parker

J. H. Shrader, Ph.D.

**Committee on Nutritional Problems** (allocated to Committee on Research and Standards)

Marjorie M. Heseltine, *Chairman*, U. S. Children's Bureau, Washington, D. C.

Ruth C. Clouse, Ph.D.

Walter H. Eddy, Ph.D.

D. Breese Jones, Ph.D.

Charles G. King, Ph.D.

E. V. McCollum, Ph.D.

Helen S. Mitchell, Ph.D.

Roe E. Remington, Ph.D.

Lydia J. Roberts, Ph.D.

William H. Sebrell, Jr., M.D.

**Committee on Assay of Foods** (allocated to Committee on Research and Standards)

Henry T. Scott, Ph.D., *Chairman*, Wisconsin Alumni Research Foundation, Madison, Wis.

Morris Ant, M.D.

Fuller D. Baird

Paul L. Day, Ph.D.

Conrad A. Elvehjem, Ph.D.

Carl R. Fellers, Ph.D.

E. M. Nelson, Ph.D.

Robert W. Pilcher, Ph.D.

**Committee on Membership and Fellowship** (unallocated)

Abraham Lichterman, Ph.D., *Chairman*, 965 East 14th Street, Brooklyn, N. Y.

Philip K. Bates, Ph.D.

Leon A. Bradley, Ph.D.

William V. Cruess, Ph.D.

James R. Esty, Ph.D.

Robert F. Huntley

Lawrence H. James, Ph.D.

Ferdinand A. Korff

H. M. Lancaster

William R. M. Wharton

**Committee on Foods (Except Milk)** (allocated to Committee on Research and Standards)

Bernard E. Proctor, Ph.D., *Chairman*, Massachusetts Institute of Technology, Cambridge, Mass.

E. M. Chace

H. C. Diehl

Sarah H. V. Dugan

Gerald A. Fitzgerald

**Coördinating Committee (allocated to Committee on Research and Standards)**

F. C. Blanck, Ph.D., *Chairman*, 1062 Progress Street, Pittsburgh, Pa.

Harry E. Goresline, Ph.D., *Chairman*, Committee on Microbiological Examination of Foods

Frederick W. Fabian, Ph.D., *Chairman*,

Committee on Analyzing Frozen Desserts  
George J. Hucker, Ph.D., *Chairman*, Committee on Food Utensil Sanitation

Merrill J. Mack, *Chairman*, Committee on Milk and Dairy Products

Bernard E. Proctor, Ph.D., *Chairman*, Committee on Foods (Except Milk)

Henry T. Scott, Ph.D., *Chairman*, Committee on Assay of Foods

## Industrial Hygiene Section

**Committee on Skin Irritants (allocated to Committee on Research and Standards)**

Louis Schwartz, M.D., *Chairman*, U. S. Public Health Service, Washington, D. C.

Leon H. Warren, M.D.

Theodore F. Hatch

Richard T. Page

Charles R. Williams, Ph.D.

**I. Committee on Ventilation and Atmospheric Pollution (allocated to Committee on Research and Standards)**

Emery R. Hayhurst, M.D., *Chairman*, 1925 Concord Road, Columbus, O.

Philip Drinker

Leonard Greenburg, M.D.

W. J. McConnell, M.D.

Carey P. McCord, M.D.

*Subcommittee on Bacteriological Procedures*  
William F. Wells, *Chairman*, University of Pennsylvania, Philadelphia, Pa.

Prof. Earle B. Phelps

C.-E. A. Winslow, Dr.P.H.

**Committee on Standard Practices in the Problem of Compensation of Occupational Diseases (allocated to Committee on Research and Standards)**

Henry H. Kessler, M.D., *Chairman*, State Department of Labor, Newark, N. J.

Manfred Bowditch

Bernard S. Coleman

Leonard J. Goldwater, M.D.

Emery R. Hayhurst, M.D.

Eleanor Rantoul

R. R. Sayers, M.D.

**II. Committee on Standard Methods for the Examination of Air**

Emery R. Hayhurst, M.D., *Chairman*, 1925 Concord Road, Columbus, O.

Philip Drinker

Leonard Greenburg, M.D.

W. J. McConnell, M.D.

Carey P. McCord, M.D.

Harry B. Meller

**Committee on Lead Poisoning (allocated to Committee on Research and Standards)**

Robert A. Kehoe, M.D., *Chairman*, University of Cincinnati, Cincinnati, O.

Elston L. Belknap, M.D.

W. C. Dreessen, M.D.

George H. Gehrman, M.D.

Milton H. Kronenberg, M.D.

May R. Mayers, M.D.

William P. Yant

*Subcommittee on Physical Procedures*

C. P. Yaglou, *Chairman*, Harvard School of Public Health, Boston, Mass.

Prof. Alonzo P. Kratz

C.-E. A. Winslow, Dr.P.H.

*Subcommittee on Chemical Procedures*

Frederick H. Goldman, Ph.D., *Chairman*, National Institute of Health, Bethesda, Md.

Allan L. Coleman

Hervey E. Elkins

Helmuth H. Schrenk, Ph.D.

Clayton A. Smucker

**Committee on Pneumoconiosis (allocated to Committee on Research and Standards)**

R. R. Sayers, M.D., *Chairman*, Bureau of Mines, U. S. Department of the Interior, Washington, D. C.

Leroy U. Gardner, M.D.

Leonard Greenburg, M.D.

Emery R. Hayhurst, M.D.

A. J. Lanza, M.D.

*Subcommittee on Dust Procedures*

J. J. Bloomfield, *Chairman*, National Institute of Health, Bethesda, Md.

**Committee on Industrial Anthrax (allocated to Committee on Research and Standards)**

Henry Field Smyth, M.D., *Chairman*, University of Pennsylvania, Philadelphia, Pa.

Volney S. Cheney, M.D.

Walter D. Higgins, M.D.

**Committee on Volatile Solvents (allocated to Committee on Research and Standards)**

Henry F. Smyth, Jr., Ph.D., *Chairman*, Mellon Institute, Pittsburgh, Pa.

Warren A. Cook

Don D. Irish, Ph.D.

Henry Field Smyth, M.D.

William P. Yant

**Maternal and Child Health Section**

**Committee on Dentistry (unallocated)**

Guy S. Millberry, D.D.S., *Chairman*, R. F. D. No. 2, Box 181, Los Gatos, Calif.

M. Luise Diez, M.D.

Lon W. Morrey, D.D.S.

**Committee on Scientific Exhibits (unallocated)**

Jessie M. Bierman, M.D., *Chairman*, U. S. Children's Bureau, Washington, D. C.

Harry J. Benz, M.D.

Albert McCown, M.D.

**Committee on Coördination of Activities with the American School Health Association (unallocated)**

Bernard W. Carey, M.D., *Chairman*, 660 Frederick Street, Detroit, Mich.

Dorothy B. Nyswander, Ph.D.

Jessie M. Bierman, M.D.

**Program Committee (unallocated)**

E. V. Thiehoff, M.D., *Chairman*, State Department of Health, Lansing, Mich.

Leona Baumgartner, M.D.

Hugh J. Bickerstaff, M.D.

Amy L. Hunter, M.D.

Charles L. Outland, M.D.

**Committee on Membership and Fellowship (unallocated)**

Martha L. Clifford, M.D., *Chairman*, State Department of Health, Hartford, Conn.

Robert W. Ball, M.D.

Maud A. Brown

Walter H. Brown, M.D.

Helen A. Cary, M.D.

Mary E. Chayer, R.N.

Amos Christie, M.D.

Martha M. Eliot, M.D.

Elizabeth M. Gardiner, M.D.

Thistle M. McKee, M.D.

Lon W. Morrey, D.D.S.

George T. Palmer, Dr.P.H.

Edith P. Sappington, M.D.

**Public Health Nursing Section**

**Committee on Membership (unallocated)**

Naomi Deutsch, R.N., *Chairman*, U. S. Children's Bureau, Washington, D. C.

Mildred E. Garrett, R.N.

Janet Jennings, R.N.

Ruth E. Mettinger, R.N.

Sophie C. Nelson, R.N.

Lucille Perozzi, R.N.

**Committee to Study Duties of Nurses in Industry (unallocated)**

\_\_\_\_\_, *Chairman*,

Mary Alton, R.N.

Joanna Johnson, R.N.

Frances R. Kahl, R.N.

Ella E. McNeil, R.N.

Ruth C. Waterbury, R.N.

**Committee to Study Relationships Between Official and Nonofficial Agencies (unallocated)**

Julia L. Groscop, R.N., *Chairman*, 311 South Juniper Street, Philadelphia, Pa.

Laura A. Draper, R.N.

Helen F. Dunn, R.N.

Anne H. McCabe, R.N.

Kathryn C. Trent, R.N.

Ruth TeLinde

Marion A. Fluent

Marion C. Woodbury, R.N.

Eula B. Butzerin, R.N.

Emilie G. Sargent, R.N.

Lilly Harman

## Public Health Education Section

Committee on Community Organization for Health Education (Joint with the Health Officers Section) (unallocated)

Clair E. Turner, Dr.P.H., *Chairman*, Massachusetts Institute of Technology, Cambridge, Mass.

Ira V. Hiscock, Sc.D.

Harold H. Walker, Ph.D.

*Consultants*

Jessie M. Bierman, M.D.

C. Mayhew Derryberry, Ph.D.

Frank W. Hubbard

Delbert Oberteuffer, Ph.D.

James F. Rogers, M.D.

Committee on School Health Policies (unallocated)

Edna A. Gerken, C.P.H., *Chairman*, U. S. Indian Service, Denver, Colo.

Isabelle F. Borden, M.D.

Vivian Drenckhahn, C.P.H.

William P. Shepard, M.D.

Clair E. Turner, Dr.P.H.

Charles C. Wilson, M.D.

J. M. Wisan, D.D.S.

Committee to Study the Work of the Section (unallocated)

David B. Treat, *Chairman*, Department of Health, Flint, Mich.

Muriel F. Bliss, C.P.H.

Ruth E. Grout, Ph.D.

Committee for the Study of State Administration of Health Education (unallocated)

Burt R. Rickards, *Chairman*, State Department of Health, Albany, N. Y.

Marjorie Delavan

Reba F. Harris, *Secretary*

Jean V. Latimer

Elizabeth C. Nickerson, C.P.H.

Committee on Coördination of Activities (Joint with the Maternal and Child Health Section and the American School Health Association) (unallocated)

Carl A. Wilzbach, M.D., *Chairman*, 3111 Parkview Avenue, Cincinnati, O.

Sally Lucas Jean

## Health Officers Section

Committee on Coördination of Public Health Engineering Activities (to coöperate with the Committee of the Engineering Section)

R. H. Markwith, M.D.

William P. Richardson, M.D.

Committee on Housing (allocated to Committee on Research and Standards)

Huntington Williams, M.D., *Chairman*, Commissioner of Health, Baltimore, Md.

L. M. Graves, M.D.

Andrew J. Krog

George C. Ruhland, M.D.

Henry F. Vaughan, Dr.P.H.

Representatives of the American Public Health Association to  
Other Organizations and Committees for 1941

Advisory Council on Medical Education  
William D. Stovall, M.D.

American Association for the Advancement  
of Science  
Reginald M. Atwater, M.D.  
Abel Wolman, Dr.Eng.

American Documentation Institute  
Halbert L. Dunn, M.D.

American Committee on Maternal Welfare  
Thomas Parran, M.D.

American Hospital Association  
Charles F. Wilinsky, M.D.

American Society of Civil Engineers and  
Federation of Sewage Works Associations  
Joint Committee for Revision and Ex-  
tension of Definitions and Terms Used  
in Sewerage and Sewage Disposal  
Practice  
Paul Hansen

American Society for Testing Materials  
Committee on Soap  
Carl R. Fellers, Ph.D.

American Standards Association  
Building Code Correlating Committee  
James Lloyd Barron, C.E.  
W. Scott Johnson, alternate

Letter Symbols and Abbreviations for  
Science and Engineering  
Earle B. Phelps

Safety Code for Exhaust Systems  
Henry Field Smyth, M.D.

Sectional Committee on Allowable Concen-  
trations of Toxic Dusts and Gases  
J. J. Bloomfield

Sectional Committee on Bedding and Up-  
holstery—Sub-Committee on Steriliza-  
tion  
F. J. Maier

Sectional Committee on Building Code Re-  
quirements for Light and Ventilation  
Rollo H. Britten  
C.-E. A. Winslow, Dr.P.H.

Sectional Committee on School Lighting  
Leonard Greenburg, M.D.  
Joel I. Connolly, alternate

Sectional Committee on the Safety Code  
for Industrial Sanitation in Manufac-  
turing Establishments  
Emery R. Hayhurst, M.D.  
Leonard Greenburg, M.D., alternate

Ventilation Code  
Earle B. Phelps

American Water Works Association  
Coördinating Committee on Methods of  
Water Treatment and Laboratory  
Control  
Charles R. Cox, *Chairman*  
Lt. Col. George C. Dunham, M.D.  
Albert V. Hardy, M.D.

Commission for the Study of Biological Stains  
William D. Stovall, M.D.

National Conference for Coöperation in School  
Health Education  
Ira V. Hiscock, Sc.D.

National Council for Mothers and Babies  
Hazel Corbin

National Health Council  
Reginald M. Atwater, M.D.  
Louis I. Dublin, Ph.D.

National Technological Civil Protection Com-  
mittee (appointed by the Secretary of  
War)  
Abel Wolman, Dr.Eng.  
Arthur E. Gorman, alternate

U. S. Public Health Service  
Advisory Committee on Revision of  
Treasury Department Drinking Water  
Standards  
Abel Wolman, Dr.Eng.



# Resolutions

THE following Resolutions were unanimously adopted by the Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 10, 1940:

## 1. APPRECIATION TO OFFICIALS AND GROUPS

RESOLVED that the American Public Health Association expresses its grateful appreciation to the Michigan Committee and the agencies represented thereon and the Michigan Public Health Association for their gracious hospitality, and be it further RESOLVED that the warm thanks of officers and members be extended to Dr. Henry F. Vaughan, Health Commissioner of Detroit, and to Mr. Abner Larned, the General Chairman of the Local Committee for their many courtesies and their efficiency in making provisions for this meeting and in the conduct thereof.

## 2. APPRECIATION TO THE PRESS AND RADIO

RESOLVED that the American Public Health Association acknowledges its indebtedness to the press, national, state, and local, for its excellent service in connection with the Sixty-ninth Annual Meeting.

RESOLVED that the American Public Health Association expresses its grateful appreciation to Radio Station WWJ for its excellent service in connection with the Sixty-ninth Annual Meeting.

## 3. APPRECIATION TO EXHIBITORS

RESOLVED that the American Public Health Association expresses its grateful appreciation to its friends and co-operators who have presented at its Sixty-ninth Annual Meeting the excellent exhibits, both scientific and technical, which are of such great interest and value to the public health profession.

## 4. THANKS TO HOTELS

RESOLVED that the American Public Health Association expresses its appreciation to the Hotel Book-Cadillac and to the Hotel Statler for their valuable assistance in the conduct of the Sixty-ninth Annual Meeting.

## 5. IN MEMORIAM

RESOLVED that it is with a sense of irreparable loss that the American Public Health Association records, since its last Annual Meeting, the death of forty-eight Fellows and members, the names of whom constitute a part of this resolution:

- Dr. J. A. Amyot, Ottawa, Ont., Canada, Elected Member 1900, Elected Fellow 1925, Elected Honorary Fellow 1932
- Malcolm O. Austin, M.D., San Francisco, Calif., Elected Member 1938
- Levi A. Barnett, M.D., Greenwood, Miss., Elected Member 1932
- W. A. Brumfield, M.D., Farmville, Va., Elected Member 1915
- Lewis V. Carpenter, University Heights, N. Y., Elected Member 1932, Elected Fellow 1937
- Frederick D. Carr, M.D., Batavia, N. Y., Elected Member 1934
- Robert C. Cook, M.D., Springfield, Ill., Elected Member 1925
- Platt W. Covington, M.D., Salt Lake City, Utah, Elected Member 1919, Elected Fellow 1930
- Richard S. Craig, B.S., Baltimore, Md., Elected Member 1930
- Charles Daligny, M.D., Troy, N. C., Elected Member 1937
- R. G. DeVoist, M.D., Cincinnati, Ohio, Elected Member 1927
- A. J. Douglas, M.D., Winnipeg, Manitoba, Canada, Elected Member 1903, Elected Fellow 1922
- John S. Douglas, M.B., D.P.H., Halifax, N. S., Canada, Elected Member 1936
- Livingston Farrand, M.D., Brewster, N. Y., Elected Member 1910, Elected Fellow 1927

Clifford P. Fitch, D.V.M., St. Paul, Minn.,  
Elected Member 1915

Prof. J. G. Fitzgerald, M.D., Toronto, Ont.,  
Canada, Elected Member 1912, Elected  
Fellow 1924

Filip C. Forsbeck, M.D., Cincinnati, Ohio,  
Elected Member 1932, Elected Fellow 1935

Prof. Frederick P. Gay, M.D., New York,  
N. Y., Elected Member 1924

Edith Gordon, M.D., Dr.P.H., Toronto, Ont.,  
Canada, Elected Member 1921

Eloise A. Hafford, Pasadena, Calif., Elected  
Member 1935

George W. Hemmeter, M.D., Baltimore, Md.,  
Elected Member 1936

F. M. Houghtaling, M.D., Sandusky, Ohio,  
Elected Member 1920

Allan J. Hruby, M.D., Chicago, Ill., Elected  
Member 1932

Philip P. Jacobs, Ph.D., Morristown, N. J.,  
Elected Member 1912, Elected Fellow 1922

Albini Jeanotte, M.D., D.P.H., Lachine, Que.,  
Canada, Elected Member 1930

I. W. Knight, M.D., Dr.P.H., Pitman, N. J.,  
Elected Member 1916

S. Adolphus Knopf, M.D., New York, N. Y.,  
Elected Member 1929

H. W. McComas, M.D., Oakland, Md.,  
Elected Member 1920

Charles F. Mebus, Glenside, Pa., Elected  
Member 1928

Frederick G. Metzger, M.D., Carthage, N. Y.,  
Elected Member 1919

Casper W. Miller, M.D., Wallingford, Pa.,  
Elected Member 1919

Charles F. Nassau, M.D., Sc.D., LL.D., Phila-  
delphia, Pa., Elected Member 1939

Loran E. Orr, M.D., Springfield, Ill., Elected  
Member 1936

Margaret A. Paul, R.N., Lansdowne, Pa.,  
Elected Member 1932

Stuart Pritchard, M.D., Battle Creek, Mich.,  
Elected Member 1931

James Roberts, M.D., Hamilton, Ont., Canada,  
Elected Member 1907, Elected Fellow 1922

Fred L. Schoenberger, Columbus, Ohio,  
Elected Member 1939

E. H. Smith, M.D., Redding, Conn., Elected  
Member 1919

Willard B. Soper, M.D., West Haven, Conn.,  
Elected Member 1927

Samuel J. Stewart, M.D., Alhambra, Calif.,  
Elected Member 1925, Elected Fellow 1932

A. C. Stokes, M.D., Omaha, Nebr., Elected  
Member 1928

Frances L. Syrett, Shreveport, La., Elected  
Member 1936

C. C. Threlkel, M.D., Morgantown, Ky.,  
Elected Member 1932

Robert H. Trumble, M.D., London, Ohio,  
Elected Member 1938

Charles R. Tyler, New York, N. Y., Elected  
Member 1921

Hyman I. Vener, M.D., Los Angeles, Calif.,  
Elected Member 1934

H. E. Young, M.D., Victoria, B. C., Canada,  
Elected Member 1916, Elected Fellow 1922,  
Elected Honorary Fellow 1932

Hans Zinsser, M.D., Sc.D., Boston, Mass.,  
Elected Member 1920, Elected Fellow 1934

## 6. PUBLIC HEALTH ENGINEERS IN ENVIRONMENTAL SANITATION

WHEREAS essential measures for the ad-  
justment and control of the great  
variety of environmental conditions  
which affect human health constitute  
a large part of the program of federal,  
state, and local health departments  
and, in the aggregate, involve large  
expenditures of public and private  
funds, and

WHEREAS the economical and effective  
control of any public health aspect of  
the environment on a community-  
wide basis presents important engi-  
neering problems of investigation,  
analysis, design, organization, and  
supervision, therefore be it

RESOLVED that in state and local health  
departments provision should be  
made for responsible supervision of  
all environmental sanitation pro-  
cedures and activities by properly  
qualified public health engineers, and  
be it further

RESOLVED that the scope of responsi-  
bility of engineering divisions of state  
health departments should be ex-  
panded and their coöperative rela-  
tionships with other divisions of state  
and local health service and with  
other agencies should be extended  
wherever necessary in order to pro-  
vide competent engineering guidance  
and to obtain greater unity and effec-  
tiveness in the program for sanitation  
of the environment in the several  
states.

# 7. APPRECIATION TO DR. MAZYCK P. RAVENEL

RESOLVED that the American Public Health Association desires to express to Dr. Mazyck P. Ravenel its sincere appreciation of his scholarly and faithful services as editor of the *American Journal of Public Health* from which duty he retires on December 31 to become Editor Emeritus.

# 8. APPRECIATION TO DR. JAMES WALLACE

RESOLVED that the American Public Health Association desires to express to Dr. James Wallace its sincere appreciation of his untiring and effective services in connection with the work of the Committee on Administrative Practice from which responsibilities he retires on October 15.

# 9. NATIONAL DEFENSE

WHEREAS the safety of our nation fundamentally depends upon the continued and free development and application of expert knowledge in the various technical fields of defense, including the maintenance of the public health, therefore be it

RESOLVED that the American Public Health Association endorses the principle of selective draft and urges that in the application of that principle consideration be given to maintaining the flow of necessary expert personnel into the medical, nursing, and engineering professions and into other fields related to public health, by upholding the standards and protecting the enrollment of professional schools and the essential personnel of hospitals and health departments where such experts serve and are being trained for service, and be it further

RESOLVED that the American Public Health Association emphasizes the necessity for maintaining the health of the civilian population as an essential element in national defense, and be it further

RESOLVED that the American Public Health Association pledges to the national defense the united support of its members in whatever fields they may be called to serve, and rededicates itself to the maintenance of health in a free people.

# Desirable Minimum Functions and Organization Principles for Health Activities\*

## I. GENERAL CONSIDERATIONS

THE people of North America have, for the past ten years and more, enjoyed a condition of good health not previously attained in any great population group of diverse races. This is not merely an accident of good fortune, not wholly an unearned asset of favorable climate or geography, not alone the result of living standards higher than those which prevail in some other nations of Western civilization.

The good health of the people of this continent today, their entire freedom from certain pestilential diseases prevalent in former times, and the progressive reduction in the spread of epidemic disease still commonly experienced can be largely attributed to the consistent, continuous application of the medical and associated sciences through the medium of civil government.

As a result of 75 years of practical experience, the basic principles of official health services are now everywhere recognized as necessary in any community of modern society. These principles have been accepted generally by the governments of the United States and Canada, and are universally endorsed by the several professions concerned. The protection and promotion of the health and the welfare of the citizens are conceded by all authorities

on political science to be essential functions of government and to be duties inherent in the modern state, although the obligation may be delegated in large part to its political subdivisions.

The American Public Health Association believes that the health of the citizens of the country is in a large measure the result of public interest in personal and public health developed through the work of state and local health departments, and that a sound national health demands the continuation and expansion of state and local public health activities, providing at least the minimum essentials of health protection and promotion. The Association has set down the following fundamental principles of program, administration, and organization, which may be used as a guide to health officers and other interested persons. These essentials as expressed, it is believed, represent minimum requirements compatible with the preservation and promotion of public health.

The American Public Health Association calls upon the appropriate legislative and executive officers of the national, state, and provincial authorities, and upon the rural and urban local governments of this continent to take any needed action to assure continued improvement in the people's health, upon which alone permanent security and happiness of life is founded.

\* An official declaration of the American Public Health Association adopted October 9, 1940.

## II. SCOPE AND GENERAL POLICY OF PUBLIC HEALTH WORK

Remarkable advances in the medical sciences have increased the means of controlling disease. To be useful these measures must be practically applied. Some measures for prevention and control are applicable by the action of individuals alone: others will require action by government or by nonofficial organizations.

Great advances in knowledge concerning infectious diseases were made toward the close of the last century, and provided the foundation for the application of measures which have prevented or greatly reduced a number of *communicable diseases that have long afflicted mankind*. Many of these communicable diseases are no longer numbered among the chief causes of death. New knowledge of the causes and of methods of diagnosing, treating, or controlling a number of other important diseases has steadily increased, and further advances may be expected in our knowledge of the disorders of nutrition, diseases of the heart and arteries, cancer, disorders of the mind and personality, and other major causes of disability and death. Application of this knowledge in the interest of the public health will depend upon the possibility of its practical application and the extent of public support.

Health departments should be responsive to public demand. The scope and policy of public health work at any given time will depend upon the stage of development of medical, sanitary, and related sciences, and upon the readiness of the public to support their effective use. Any formulation of the scope and the general policies of public health work must, therefore, be in terms sufficiently broad to include expansions made possible by developments in these sciences and in public understanding of their social usefulness.

With these considerations in mind, the following general policies may be stated:

1. A health problem becomes one of public concern when, because of its nature and extent, its solution requires organized group action.
2. A community is responsible for those public health procedures that are community-wide in their application (as in the case of sanitary measures) and for those that are intended to conserve the health of individuals who, for any reason, are unable to command health protection at their own expense.
3. Public health service may properly include not only well recognized procedures, such as those of sanitation, vital statistics, the prevention and control of communicable diseases, and health education of individuals, but also:
  - a. Needed services, unless otherwise provided, for individuals afflicted with certain conditions and diseases which have a wide prevalence, a high cost of treatment, and are amenable to organized effort, such as those already found practicable in the treatment under public auspices of mental disease, tuberculosis, cancer, pneumonia, and syphilis.
  - b. Such responsibility for other medical care of individuals as may be delegated by legislatively expressed public policy to the health department rather than to some other branch of government.

### RESPONSIBILITY IN REGARD TO CARE OF THE SICK

Various forms of tax-supported medical care are in operation for needy persons in many communities by the action of local or state governments. These systems are expanding. Many professional societies and lay organiza-

tions are also undertaking plans for the provision of medical care on a prepayment or insurance basis for self-supporting persons of small means.

Included among the obligations of the medical officer of health to the community is that he inform himself as to the facilities for the general care of the sick, their character and distribution, and that he make use of his position to see to it that any important inadequacies are corrected by appropriate action.

We believe that health officers should participate with other governmental and with voluntary bodies, particularly the medical profession, in planning for the improvement, coördination, and extension of medical facilities and services. Diagnostic facilities, treatment, and individual instruction in personal hygiene, through medical conferences and visits by public health nurses, should be provided by health departments for all persons needing such services who are not in position to obtain them under conditions which make their general utilization reasonably probable.

#### HEALTH DEPARTMENT AS A LEADER FOR ALL COMMUNITY HEALTH WORK

It is believed that a comprehensive and well coördinated public health program in any local community or state can exist only when the health department assumes the leadership in public health administration. The health officer is properly held responsible for the performance of such functions as are necessary to secure the maximum of health and longevity of which the people of his community are capable. This does not imply that all services for the protection and promotion of public health must be carried on as official health functions, but rather that the department shall recognize the need of services, participate in the planning, and insure the coördination of

activities carried on by other agencies, official and voluntary, in an adequate plan of health service applicable to the entire community. The health department should be willing to assume added responsibilities for this purpose when adequately supported.

#### III. ESSENTIAL LOCAL PUBLIC HEALTH SERVICES

A modest but adequate health program for the people of North America can be guaranteed if the following basic principles of work are observed.

For all official health organizations operated under federal, state, or local authority, leadership and responsibility should be vested in a full-time trained health officer appointed on professional qualifications and secure against political interference or dismissal during competent performance; he should receive a salary equivalent to the net income of physicians or other professional men of equal training, and commensurate with the public responsibilities placed upon him; he should not engage in any other gainful occupation inconsistent with the proper conduct of his office such as the private practice of medicine, and should be required to give his whole time to its duties; annual appropriation for official health work totalling at least \$1.00 per capita of population served should be provided for the minimum activities hereafter described, and exclusive of medical care and hospital services; freedom for the health officer to select trained personnel for medical, nursing, sanitary, laboratory, and statistical activities from lists of persons of proved competence should be assured.

There should be in every state (or province) or city, a board of health or public health council (serving preferably without pay). The function of such a board of health or council should be to advise with the health officer in determining the general policies of the

health department and to enact those ordinances or regulations for which it has authority. The same principle is probably applicable in smaller local units, counties, or rural health districts. Such a board should have no administrative or executive functions.

This body should include physicians, members of other appropriate professions, and representatives of the general public.

The state, city, or other local health officer should be directly responsible either to his board of health, or to the chief executive of the governmental area concerned.

With such leadership and resources a program of local health department activities should be undertaken which will include at least the following six primary functions of modern health departments and should be directed by full-time trained experts responsible to the health officer, except where the organization is too small to justify such desirable specialization of personnel.

#### LOCAL HEALTH DEPARTMENT FUNCTIONS

##### A. *Vital Statistics:*

The collection, tabulation, analysis, interpretation, and publication of reports of births, deaths, and notifiable disease. This, the first public function upon which all competent planning for health protection is based, is no more than the official bookkeeping of the human family within the political or governmental unit.

##### B. *Sanitation:*

The control of the material environment of man in the interest of human survival, comfort, and use.

The specific responsibilities in this respect include\*:

1. Safeguarding all water supplies, both public and private, commercial

and household, so that the purity of the water for dietary, cleansing, or recreational use may be universal.

2. Securing the sanitary disposal of human and industrial wastes in a manner to avoid nuisance, and prevent the pollution of foods or water supply.
3. Supervision of the production and distribution of milk, and milk products, by licensing, inspection, and laboratory tests, to prevent the sale of any but a clean, wholesome pasteurized milk of standard food value.
4. Supervision of the production, processing, and distribution of foodstuffs, including shellfish, and of drugs and devices offered to the public for treatment of sickness.
5. Supervision of all places of human habitation to secure adequate light, air, water, sanitary necessities, protection from inclemencies of weather, and to prevent overcrowding of occupants. Also control over the environmental sanitation of public camp sites, swimming pools, bathing beaches, parks, and other public properties. (Present community housing programs offer the health department opportunity for coöperative leadership.)
6. Control of mosquitoes, other insects, rats, and other vermin, such as may affect the public health.
7. Control over the environmental conditions of employment.
8. Control over atmospheric pollution by smoke, dust, and harmful fumes.

##### C. *Control of Communicable and Preventable Diseases:*

Disease control has always been and continues to be a basic activity of public health service. Health departments will fail to win the confidence of the general public or will fall in public esteem if they do not succeed in preventing epidemics of certain com-

\* Not necessarily in the order of local importance.

municable diseases. Practical application still lags far behind definite knowledge already attained which would enable physicians, public health authorities, and an enlightened public, working intelligently together, to make much greater progress in the control of many communicable diseases and to eradicate others as public health problems.

Specific responsibilities of the health departments include provision for the reporting of cases, the isolation of patients, and immunization of susceptible persons.

With regard to tuberculosis, syphilis, gonorrhea, malaria, hookworm disease, and epidemic diarrheas, there must be also systematic effort to find cases of infection not yet the subject of official report. Diagnostic, consultative, and treatment facilities must be provided where necessary, and particularly for tuberculosis, there is needed x-ray service for diagnosis and review of progress, and sanatorium care.

Health department service for other than communicable diseases of preventable character and of public health interest should include studies of incidence, diagnostic service, and educational activities.

#### D. *Laboratory Service:*

A well organized public health laboratory with a competent professional staff is one of the fundamentals of effective health work with the communicable diseases, and is useful to an increasing degree in a wide variety of correlated public health functions.

Specific responsibilities of health departments include the building up and maintaining of a laboratory service which will provide assistance to practicing physicians and the department's staff in the diagnosis of communicable disease. A prompt and reliable laboratory service will be an important factor in stimulating friendly relations

between physicians and the health department. Control of foods and many other features of general sanitation depend for their effectiveness upon the skills and technics of the public health laboratory.

#### E. *Protection of Health in Maternity, Infancy, and Childhood:*

Beginning its social concern with the health status of the man and woman preparing for marriage, continuing with the protection of the health of the expectant mother, the new-born, the infant, the preschool and school child, and finally supervising the conditions of work and the fitness to work of young people, the health department deals with the important problems of human reproduction, growth, and development. Efficient conduct of services for the safeguarding of the health of mothers and young children materially reduces the burden of activities intended to control tuberculosis, syphilis, and other communicable diseases, and lessen the load placed on the school health service. Such functions are interrelated and must be coördinated.

Whether school health service is provided by the department of health or by the educational authorities of the community, there should be formal provision for collaboration between these two departments of civil government (the schools and the health agencies) to avoid duplication of services and conflict of authority.

#### F. *Public Health Education:*

Modern public health practice has shown how to prevent much sickness and many premature deaths. It is a responsibility of health departments to make the knowledge of disease prevention, treatment, and control accessible to the average man in a form that he can understand and make a part of his living. The education of the people



in such matters may be accomplished through such channels as newspapers or magazines; the production and distribution of books and pamphlets; pictures and exhibits; by means of personal work with individuals and groups on the part of public health nurses and other professional and lay staff members; by means of lectures, personal and group demonstrations, the film, and the radio.

Many fields of preventive medicine can be cultivated, and effective progress made, chiefly or only after the public concerned have learned what they themselves can and must do in their own interest and through the services of their physicians or through community agencies. The campaigns of education against tuberculosis, diphtheria, and syphilis, where official control is of great importance, are instructive examples of what might be achieved in teaching people all the facts they can understand about cancer, diabetes, heart diseases, nutritional diseases, occupational diseases, some diseases of mentality or personality, and especially the care of the expectant mother and of young children. The extent of effectiveness and the limitations of modern medical, sanitary, and related science should be made a part of the knowledge common to all citizens.

#### PUBLIC HEALTH NURSING

The work of the department of health as it relates to communicable disease control, to maternity and child hygiene, to public health education, and, in many rural areas, to sanitation, depends upon the services of public health nurses professionally directed and supervised.

Public health nurses, qualified to meet the standards of their profession, are essential to effective public health work. In communicable disease control and in giving advice about the feeding, rest, the health of children and

mothers, their services are effective and are welcomed. They interpret the directions of the private physicians and of the physician of the health department. Their organizing ability and coöperation can be relied upon for community projects.

#### RESEARCH

Maintenance of essential health services at a high level, and assurance of improvement in the critical analysis of all that is done in the public interest require that the personnel of each major division of every health department give time and attention to the review and study of pertinent health problems. The health department should be a source of new and accurate knowledge of preventive medicine and public health practice as well as being the agency through which long established facts of science are made practically effective.

#### RELATION OF PRIVATE PHYSICIANS TO PUBLIC HEALTH

The employment of a competent physician to guide the household in health as in sickness is the best investment the private individual can make for health. Physicians in private practice who are the major reliance of our people in the care of disease, can also be of value to their patients in applying the principles of preventive medicine. The public should be encouraged to obtain preventive service from their private physicians.

Health departments in their educational programs should try to develop a demand for preventive services rendered by private physicians. Participation by private physicians in general health programs recommended by the health department is indispensable in the interest of the health of the community.

Health departments should also be prepared to accept the responsibility of

planning or for supplying needed preventive services for persons who are not able to pay for them on an individual basis.

In deciding whether a given health procedure should be conducted by the department of health directly or by individual medical practitioners or other agencies, the primary consideration should be the welfare of the community. Relative cost, relative efficiency, and the practicability of adequate supervision must be considered. Where these factors are reasonably equal, preference should be given to a program which decentralizes health procedures so as to enlist the private practitioner in their application.

#### IV. STATE AND NATIONAL HEALTH SERVICES

Complementary to the proper activities of local health departments are the health functions of state and national governments.

State health functions include at least the following:

1. Study of state health problems and planning for their solution as may be necessary.
2. Coördination and technical supervision of local health activities.
3. Financial aid to local health departments as required.
4. Enactment of regulations dealing with sanitation, disease control, and public health, which have the force of law throughout the state.
5. Establishment and enforcement of minimum standards of performance of work of health departments, particularly in communities receiving state aid for public health.
6. Maintenance of a central laboratory, and where necessary branch laboratories, for the standard functions of diagnostic, sanitary, and chemical examinations; production or procurement of therapeutic and prophylactic preparations, and their free

distribution for public health purposes; establishment of standards for the conduct of diagnostic laboratories throughout the state; laboratory research into the causes and means of control of preventable diseases.

7. Collection, tabulation, and publication of vital statistics for each important political or health administrative unit of the state and for the state as a whole.
8. Collection and distribution of information concerning preventable diseases throughout the state.
9. Maintenance of safe quality of water supplies and controlling the character of the disposal of human waste for all communities of the state.
10. Establishment and enforcement of minimum sanitary standards for milk supplies.
11. Provision for services to aid industry in the study and control of health hazards due to occupation.
12. Prescription of qualifications for certain public health personnel.
13. Formulation of plans in coöperation with other appropriate agencies for the prompt mobilization of services to meet the health needs.

National, as distinct from state and local, health functions include at least the following:

1. Study of national health problems and planning for their solution as may be necessary on a national scale.
2. Meeting the obligations assumed under the provisions of international treaties.
3. Control of communicable diseases in international and interstate commerce.
4. Administration of medical and health services on non-military national property and for certain classes of federal employees.

5. Discovery of the causes and means of control of disease through organized research.
6. Sanitary control of interstate traffic and common carriers.
7. Control of foods and drugs in interstate commerce.
8. Assistance to states, and through the states to local areas, in the extension or improvement of their health services. This assistance may be either technical or financial, or both, as circumstances may require.
9. Central collection, tabulation, and publication of vital statistics of the various component political units (states or provinces, cities and rural areas).
10. Establishment of standards of control of manufacture and sale of biological products used in the treatment of disease.

#### RELATIONS OF STATE AND LOCAL SERVICE

The Association believes that local authorities should assume the primary responsibility for carrying out the program here recommended since the major part of direct service to people can be most efficiently and economically rendered on a community basis. A permanent, efficient, and economic solution of health administration on a state-wide basis can come only through the organization of local (city, county, or district) health departments serving communities of sufficient size to make possible the employment of competent, technically trained executives who are responsible for the development of a sound comprehensive program, and who devote their whole time and energies to public health work. Such a department should include the medical, nursing, engineering, laboratory, inspec-

torial, and clerical personnel necessary to carry on a complete program.

#### STATE AID FOR LOCAL HEALTH SERVICES

Public health is a primary responsibility of each local community, but it is indispensable that authority should be vested in the state department of health to make certain for the state as a whole that the health in communities where local control is effective will not be jeopardized by the inertia, incompetence, or neglect of the local government of other communities.

Furthermore, public health problems are usually more than local and there is wide divergence in the ability of local communities to meet the cost of adequate health programs, and, since in certain fields there is need of the assistance and guidance of highly trained staffs, the Association believes that state health departments must be equipped to stimulate and advise regarding local health work and to give a substantial amount of direct financial aid when necessary to such work.

#### NATIONAL AID TO THE STATES AND LOCALITIES

Economic resources and the availability of medical facilities vary widely from state to state as well as within the states. For this reason and for others, the federal government has recently adopted policies of financial and professional aid to the states which aim to encourage the organization and maintenance of public health services where needed, and to assist in the education of professional personnel. Health services under state laws and local ordinances should maintain, as they do at present, the principle of the primary state and local responsibility for administration.

## REPORTS OF COMMITTEES

*THE By-laws of the American Public Health Association provide that no standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council. Except where specifically noted to the contrary, the following reports are in the nature of progress reports from committees, most of which have had Section approval, but which have not been presented for Governing Council action, and therefore are not to be interpreted as standards approved by the American Public Health Association.*

# Administrative Practice\*

AT THIS, the Sixty-ninth Annual Meeting of the American Public Health Association, the Committee on Administrative Practice begins its twenty-first year of existence.

In 1920, a professional group of public health workers determined to pool its knowledge and experience and to enlist the coöperation of health officers and other health administrators throughout the country in an effort to develop improved standards of scientific achievement in public health service. Eventually this group became the Committee on Administrative Practice. During the past twenty years it has made substantial contributions to administrative practice and has transformed a confusion of unrelated local enterprises into a concerted national program which is as a whole grounded in principles that are nationally applicable.

In December, 1939, the Committee on Administrative Practice met to decide whether its assigned task had been completed. Obviously, upon this question rested the decision as to a recommendation concerning its discharge as a Standing Committee. A study group, under the competent chairmanship of Dr. W. F. Walker, had been appointed a year earlier to bring in a finding of fact. The group reported that, although considerable progress had been made in regard to certain problems—for example, the control of the communicable diseases, including tuberculosis—the field as a whole is constantly expanding, and that, therefore, there is a continuing need for the study of essential prin-

ciples and methods of administrative practice.

Indeed, the recent trends in public health, advancing knowledge of the causes, prophylaxis, and specific therapy of disease, the newer knowledge of nutrition, and the increasing complexity of social and economic relationships, all combine with a variety of other factors to increase the complexity of the health officer's problems and confuse the principles upon which sound administrative practice in the application of knowledge must be grounded.

The committee agreed that there still remains the need for a forum in which these principles may be studied in the light of experience and that, though details of its program might change, its primary function still exists. It is clear that certain elements of the program must be curtailed and, by the same token, others which have yet to reach full usefulness must be expanded.

It was also agreed that, for the immediate future, the program as a whole might well be built around three major purposes: (1) Survey and consultation service, (2) Analysis and evaluation of administrative practices and (3) Conduct of special studies and services.

An open session, to which approximately 350 administrative officials were invited, was held in Detroit October 7, 1940, just prior to this Annual Meeting. Two activities: (1) studies of state health administration, and (2) evaluation of administrative practices were featured in an effort to bring the work of the committee closer to the Association members it serves and to secure, through joint discussion, some idea of ways and means by which the service might be made more useful.

---

\* Report of the Chairman of the Committee to the Governing Council.

#### SUBCOMMITTEE ON STATE HEALTH ADMINISTRATION

The Subcommittee on State Health Administration has, during the past year, directed its attention mainly to follow-up work in Oklahoma, Michigan, and Florida, the 3 states previously surveyed. A considerable proportion of the recommendations made as a result of the survey have now been adopted, but results are perhaps most dramatic in Florida, and this state is to be commended for the sustained interest and efforts of its Public Health Committee which was organized during the course of the study. As a result of the committee's work, now including more than 4,000 lay citizens, 8 counties have requested full-time service and 6 others have asked for surveys preliminary to requests for such service. As another direct result of the study in this state, the Department of Public Instruction invited the Board of Health to assist in the development of a comprehensive school health program, including curriculum, school health service and teaching methods, and the report itself was used as a guide in developing this plan.

In Michigan, the Department of Health has made a complete change of procedure in its service to local full-time health units and is now rendering advisory and consultation service instead of direct aid. The various bureaus and divisions of the department have been integrated into a more closely knit and unified organization.

Oklahoma's Department of Health has been strengthened by the employment of a well qualified deputy commissioner in charge of local health service, the establishment of a division of industrial hygiene, additional training for nurses, and the development of a more comprehensive malaria control program.

#### SUBCOMMITTEE ON EVALUATION OF ADMINISTRATIVE PRACTICES

Activities of this subcommittee have

had several concrete results. A summary including recommendations based on extensive studies of immunization procedures against diphtheria was published as a supplement to the March, 1940, issue of the *Journal*. The report of the Subcommittee on Tuberculosis Case Finding was published for the Association by the National Tuberculosis Association under the title "A Manual on Tuberculosis Case-Finding." The Subcommittees on Diphtheria, Measles, Whooping Cough, and Scarlet Fever are continuing their studies, and the subcommittee has conferred with state and federal health authorities concerning the possibility that some studies in the field of administrative health practice might be supported in part by states from their Social Security funds.

#### SUBCOMMITTEE ON PUBLIC HEALTH NURSING

A study of nursing records for 86 tuberculosis patients and their families has been made under the guidance of this subcommittee for the purpose of developing a simple method of reviewing records which would be of assistance to public health nurses in evaluating their own services, to supervisors in evaluating the work of nurses under their supervision, and to administrators in improving the efficiency of nursing service. A detailed report of this study is published in the October issue of *Public Health Nursing*.

A sequel to this study is the development of a similar method for the study of prenatal and infant nursing records, which has been used successfully by the National Organization for Public Health Nursing in connection with community studies.

#### SUBCOMMITTEE ON HEALTH CONSERVA- TION CONTESTS

The 1939 City and Rural Health Contests were brought to a successful conclusion in May, 1940. Early in

1940, it was believed, because of the limited financial support, that last year's City Contest would be the final city competition. The Metropolitan Life Insurance Company, however, has generously agreed to be the sole sponsor for the city competition during the current year.

Three changes have been made in the conduct of both contests for 1940. First, instead of attempting to grade cities or counties in numerical order, hereafter any city or county attaining a certain degree of proficiency (as judged by the Grading Committee) in its respective population or geographical group, will be placed on an Honor List. Second, all health units submitting schedules will be required to have the answers to certain questions checked by their respective state departments of health before acceptance for grading. Third, greater credit will be given to that health program in which the official health department has assumed its full share of responsibility than to the program in which the voluntary agencies still bear a disproportionate share of the burden.

The 1940 City Contest will be conducted along the same general lines as in previous years, with the exception that only cities having populations of 25,000 or more will be included. All cities desiring to enroll must have chambers of commerce affiliated with the Chamber of Commerce of the United States.

The Rural Contest will limit participating units to individual counties and to districts of not more than 4 counties, the assumption being that larger districts are not providing adequate full-time local health service. This contest is financed for the seventh consecutive year by the W. K. Kellogg Foundation of Battle Creek, Mich.

The 1940 Rural Contest will again include Canada and, for the first time, Canadian cities will participate in a

City Contest which is jointly sponsored by the Canadian Public Health Association.

In view of the fact that this is the twelfth City Contest and the seventh Rural Contest, the enthusiasm which greeted the announcement on June 14 that both the City and Rural Contests would be continued in 1940 occasioned considerable surprise.

Dr. James Wallace, Associate Field Director of the Association, whose work has been devoted mainly to the Health Conservation Contests, retired at his request in October. His persistent interest and untiring efforts to promote the activities of these two competitions have meant much to their success, and it is a source of much regret that he has been lost to the staff.

Dr. Benjamin G. Horning, an experienced administrator long interested in the contests and for the past several years Health Officer of the City of Hartford, Conn., has joined the staff as Associate Field Director in charge of the Health Conservation Contest field work.

Thus far, the City Contest reports 133 and the Rural Contest 307 entries.

#### SUBCOMMITTEE ON INDUSTRIAL HEALTH STUDIES

Formerly designated as the Subcommittee on Industrial Health Appraisal, this subcommittee has now been given the responsibility of studying the administrative practice for public health problems which lie within the field of industrial hygiene. It has coöperated closely with the National Industrial Conference Board and has permitted this board to use a condensed form of a survey section of the *Industrial Appraisal Form*. Such a schedule was sent to more than 300 industries of various types and sizes throughout the United States, and the Chairman of the Subcommittee coöperated with the board in the write-up of the survey.

Service during the past several months has been seriously curtailed by the illness of the Chairman, Dr. Bristol.

SUBCOMMITTEE ON MANUAL OF PRACTICE AND APPRAISAL OF LOCAL HEALTH WORK

Through its Chairman, Dr. W. F. Walker, this subcommittee has continued its service of replying to communications concerning appraisal standards and definitions and record-keeping referred by the Central Office.

A study section has been appointed under the Chairmanship of Dr. H. D. Chope to consider criteria and standards for bedside nursing care. Several meetings have been held.

H. A. Whittaker was recently appointed Chairman of a study group to review the items in the *Appraisal Form* pertaining to sanitation which will meet at Detroit during the Annual Meeting.

SUBCOMMITTEE ON ORGANIZED CARE OF THE SICK

This is a newly organized study group for fact finding with no charge concerning standards or recommendations. Its present lines of inquiry are:

1. Evaluation of experience acquired by health departments in administration of different elements of medical care

2. Development of methods for surveying and for appraising facilities and programs for public medical care

Upon such a factual basis it may be possible eventually to formulate principles which have practical value to health officials in dealing with problems related to medical care.

FIELD SERVICE

In addition to the service rendered through the Health Contests and State Health Studies, the field staff has made health studies in Flint, Mich., and the Territory of Alaska. During the winter term, the field director taught public health administration at the University of Minnesota.

Now upon the threshold of its twenty-first year of service, the Committee on Administrative Practice hopes that its service in the future may in some measure simplify the tasks and make easier the way for public health administrators. It seeks and will welcome the counsel and guidance of every member of the Association.

E. L. BISHOP, *Chairman*



## Eligibility\*

THE Committee on Eligibility, as one of the four Standing Committees of the Association, carries on no conspicuous program of research, but occupies perhaps one of the most vital positions in the Association structure. The eligibility of almost 1,000 candidates for election has passed through the hands of the committee in these 12 months. It is not easy to pass on all of these applications, but we believe that the committee has rendered competent service, standing at the threshold of membership and Fellowship and using its best judgment in each case.

Even more important this year, however, has been the attempt to make the criteria for Fellowship more precise and objective. Early in the year the committee acted on a request from the Executive Board to clarify the requirements governing the election of Fellows. The committee has revised the qualifications for the election of Fellows and has reported certain changes to the Committee on Constitution and By-

laws, which in turn will refer to the Executive Board and to the Governing Council at this meeting suggested amendments to the By-laws. It is believed that the new Fellowship By-laws will considerably aid the committee in its consideration of Fellowship applicants.

During the past year 893 applications for membership were referred to the Committee on Eligibility for consideration and all were approved and referred to the Executive Board for final action.

The committee also voted approval by mail of a request for affiliation from the Cuban Public Health Society.

The committee will carry out its other responsibilities at this meeting, namely, the consideration of 119 applicants for Fellowship and 38 applicants for Life Membership. One state health society has applied for affiliation, and the committee will also pass on this request.

All applications approved by the Committee on Eligibility will be referred to the Governing Council for final action.

DON W. GUDAKUNST, *Chairman*

---

\* Report of the Chairman of the Committee to the Governing Council.

## Research and Standards\*

WHEN Dr. L. R. Thompson retired as Chairman of the Committee on Research and Standards at the last Annual Meeting, the second period in development of its activities was concluded, the first having been under the Chairmanship of Dr. Abel Wolman.

In entering upon a third stage it would seem appropriate upon this occasion to redefine the place of the committee in the activities of the Association, to canvass the present status of its transactions, and to make such recommendations to the Governing Council as may be in order.

The committee is charged in the By-laws with "carrying out" and "coördinating" research. Obviously, it has at its disposal neither personnel, equipment, nor adequate funds to conduct research. Its responsibility is limited to the *promotion* of research, (1) by recognizing present current needs for investigation of public health problems; (2) by attempting to interest governmental organizations, institutes, universities, and capable individual investigators in the solution of these problems; (3) by the discreet budgeting of the limited funds available from Association or other sources to subsidize in part the needed investigations.

The promotion of research is highly correlated with the second function which the committee is called upon to perform for the Association by the By-laws, namely, the development of standards. First, it is charged with the duty of reviewing from time to time those standards which have already received

Association endorsement. Second, it is charged with the development of new standards in the technical branches of public health work.

The necessity for the first is evident. Fixed or "standard" methods, procedures, or nomenclature are of value for a limited time only. Biologic science is evolutionary, not static. For each of the standards which has received Association endorsement, the committee must render its judgment as to the time at which revision is necessary and set the machinery in motion to effect it.

With regard to proposals for new standards, it renders judgment as to whether or not the proposed procedures, methods, terminology, or units of measurement have reached a stage of development of accuracy or of general acceptance as "good practice," so that advantage will accrue through the official endorsement of the Association for general use.

In rendering its judgments the committee will at all times be cognizant of the possible disadvantage of such action. Progress is made by trial and error, by experiment, by comparison. Premature "fixation" by authoritative endorsement may retard rather than promote the advance of knowledge through creating an attitude of passive acquiescence. Trial by different methods must precede an adoption of one as best.

The function of the Committee on Research and Standards is *promotional* in relation to research and *judicial* in relation to standards, the two being closely correlated. In its judicial function it is an advisory board to the

---

\* Report of the Chairman of the Committee to the Governing Council.

Governing Council, counselling its action upon all proposals to use the word "standard" in the name of the Association and for its special field. The research, trial, and discussions leading up to the formulation of new standards, or the revision of old, is carried on by the subcommittees directly under the Committee on Research and Standards (Association level) and the subcommittees allocated to it from the Association Sections (Section level), particularly the Coördinating Committee of the Laboratory Section. The Governing Council is acquainted with the character and activities of these subcommittees through papers read at the Annual Meeting, through the *Year Book* and through the *Journal*. Upon this occasion it suffices to review in brief some of the more important matters which are of immediate concern.

Under the leadership of Dr. Haven Emerson the Subcommittee on Accuracy of Certified Causes of Death has continued to discharge its very useful function in promoting standards of nomenclature and classification of diseases and causes of death. The 1938 revision of the *International List of Causes of Death* is a completed project. The new *Handbook for Physicians* with the manual of instruction which accompanies it has been published by the U. S. Bureau of the Census and put into use this year.

To improve the registration of stillbirths and secure better information regarding the causes involved, the Division of Vital Statistics of the Bureau of the Census has proposed the use of a new certificate to replace the cumbersome method previously in vogue of filing both a birth and a death certificate. This proposal has been accepted and the new certificate put into use by a large number of states.

The Children's Bureau has proposed a code to be used as a basis for classification of the causes of stillbirths. The

Division of Vital Statistics of the Bureau of the Census has referred this code to the Subcommittee on Accuracy of Certified Causes of Death for recommendation. Consideration is pending and action will be taken at this meeting.

The Subcommittee on Autopsies has existed for more than a decade but was not allocated to the Committee on Research and Standards until 1938. It also is under the Chairmanship of Dr. Haven Emerson. The question posed was to what extent the conception of the forces of mortality, as ascertained from official certification of deaths (clinical diagnosis) differs from the conception that would derive from an analysis of autopsy findings (post-mortem diagnosis).

A project was set up to tabulate and analyze the causes of death obtained from 100,000 certificates in New York City and to compare this with a similar analysis made from 100,000 autopsy protocols assembled from the same geographic area. Financial support for the study was obtained from federal sources, and the services of a competent medical analyst were secured. The study is not yet complete.

Colonel Joseph F. Siler, Chairman of the Subcommittee to Study the Efficacy of Typhoid Vaccines, advises that investigations are proceeding at the Army Medical School. A progress report summarizing achievements to date is being presented before the Laboratory and Epidemiology Sections at this meeting by Lieut. Colonel George C. Dunham.

Under the Chairmanship of Colonel A. P. Hitchens, the Subcommittee on Standard Methods for the Examination of Dishwashing Devices has been active since 1935. Three questions are involved. The first is with regard to the epidemiological importance of dishes, tableware, and utensils as a vehicle of transfer of pathogenic microorganisms. The second question involves technical

considerations of the efficiency and economy of various dishwashing devices. The final question, and the most important from the point of view of the function of the Committee on Research and Standards, is whether it is desirable at this time to recommend the endorsement of any procedure or device by the Association. Consideration of these matters is on the agenda of this meeting, and will be the subject of report to the Governing Council at a later date.

The Subcommittee on the Hygiene of Housing, under the Chairmanship of Prof. C.-E. A. Winslow, has been most active and most productive during the past year. The current importance of the questions with which it is dealing is evidenced by the continuing support and encouragement it has received through grants and from health officers and housing specialists throughout the country. Ten sub-groups of the Housing Subcommittee are engaged in research activities, covering three major fields, namely (a) physical and engineering aspects of healthful housing, (b) social and human use aspects of healthful housing, and (c) assistance to administrators of public health and public housing programs. The findings of several of these subcommittees, the results of active investigation, are soon to be available in published form. A popular exhibit on Housing for Health was presented again this year at the New York World's Fair with the technical assistance of the subcommittee, and the public response has been gratifying. There is under consideration the establishment of a regular Housing Bureau with full-time staff in the Connecticut State Health Department to which the subcommittee would render regular consulting service. Such an

arrangement when effective will offer a major opportunity for practical service to active public health officials.

The Chairman of the Coördinating Committee on Standard Methods of the Laboratory Section, Colonel A. P. Hitchens, reports that a manuscript on diagnostic procedures and reagents, carefully prepared and critically edited, is nearing completion and will be submitted for Association endorsement after publication of the first edition. The periodic revision of *Standard Methods for the Examination of Water and Sewage* is under way. A new edition of *Standard Methods for the Examination of Dairy Products*, considerably enlarged by the addition of methods for analyzing frozen desserts, will be published in the near future.

The need for improved methods in the sanitary control of the shellfish industry has long been recognized. Through the interest of Dr. L. R. Thompson, the U. S. Public Health Service has recently established a research center in coöperation with the State Department of Health of Virginia, on Craney Island near Norfolk. It is advisable that consideration of new standards for the bacteriological examination of shellfish should wait upon the progress of the scientific studies which are being made at this station.

In conclusion, action on pending matters and new proposals will be taken by the Committee on Research and Standards at its annual meeting which is scheduled for this evening. At the present moment the committee has no recommendations to make to the Governing Council with regard to Association endorsement of any of its projects.

KENNETH F. MAXCY, *Chairman*

# American Museum of Hygiene\*

## *Association Committee*

THE Committee on American Museum of Hygiene was appointed in 1931 to carry out the purposes of a resolution adopted by the Association at its 59th Annual Meeting in Fort Worth, Tex., in 1930. This resolution directed the Executive Board of the Association to support programs for the development of museums of hygiene, and this committee has been the instrument through which the Executive Board has worked.

This support has resulted in the creation of two health museums: namely, the American Museum of Health in New York, under the direction of Homer N. Calver, Secretary of your committee; and the Cleveland Museum of Health and Hygiene, under the direction of Dr. Bruno Gebhard, who was until recently associated with the New York Museum. The former Museum has profited greatly from the opportunity afforded by the New York World's Fair. During these two years more than 11 million people have passed through the halls and have benefited from an examination of the various health exhibits. At the close of the Fair, the Museum will move into its new building in the Fair grounds, which will become the Flushing Meadows Park of New York City. Here, after appropriate alterations have been made, it will serve an increasing clientele, operating in close coöperation with the educational system of the City of New York. The

Cleveland Museum has likewise acquired a building through the gift of Mrs. Francis F. Prentiss, and plans to open some time this fall.

The committee is gratified to be able to report such definite success with reference to a project which looked hopeless when its work began nearly ten years ago. We regard the establishment of these two museums, however, as only a beginning of the program to which the committee was dedicated. Although these institutions will serve communities outside of their immediate environs, there is still the need for museums of health to be established in all of the great cities of this country. It is gratifying to know that the movement is being actively supported in San Francisco. There Dr. Shepard and his associates are hoping to organize a small museum of health, utilizing the materials now on exhibit in the Science Building at the Golden Gate International Exposition. Other museums in Chicago, Buffalo, Newark, and elsewhere have extended their collections to include exhibits on man and his health.

The committee recommends its continuation.

LOUIS I. DUBLIN, *Chairman*  
BERTRAND BROWN  
KENDALL EMERSON  
VICTOR G. HEISER  
SALLY LUCAS JEAN  
GUY S. MILLBERRY  
C.-E. A. WINSLOW  
HOMER N. CALVER, *Secretary*

\* Ninth Annual Report to the Governing Council.

COMMITTEE ON AMERICAN MUSEUM OF HYGIENE  
Organized 1931. Published reports: Year Books 1933-1934, 1934-1935, 1935-1936, 1936-1937, 1937-1939,  
1939-1940.

# Hygiene of Housing\*

DURING 1940 the organization of the committee has been strengthened by the creation of an executive committee of six members, which formulates the general policies of the committee and reviews the programs of the various research subcommittees. Ten such subcommittees are now functioning in three major fields of interest: physical and engineering aspects of healthful housing, social and human use aspects of healthful housing, and assistance to administrators of public health and housing programs.

The Subcommittee on Field Studies has completed a report on the committee's 3 year investigation of thermal, illumination, and noise conditions in occupied dwellings, in several regions of the United States. Publication of this report is being arranged. Further intensive studies of summer and winter thermal comfort conditions are now being directed by the subcommittee in a small group of experimental houses built by the John B. Pierce Foundation.

The Subcommittee on the Effects of Rehousing has completed a study of changes in family morale, participation in community affairs, and social attitudes associated with the rehousing of low-income families under the public housing program in Minneapolis—a study which seems to offer a useful method of objective measurement in these matters. This report has been published in the *American Sociological Review*.

Housing survey procedures designed to assist the local health department in dealing with its housing enforcement responsibilities have been further developed during recent months by a subcommittee charged with this activity. Schedules have been developed for the survey of general housing conditions, of structural deterioration, and of neighborhood or areal characteristics. The first official use of the general survey technic has been made at Waterbury, Conn., in a coöperative study by the municipal health department, the Yale Department of Public Health, and this committee. Parallel activity in housing inspection from the viewpoint of public health is being conducted by the District of Columbia Health Department in coöperation with the committee, and extension of this survey method into other communities is expected during the coming months.

A preliminary report of the Subcommittee on Housing Codes was published last year, and this committee is now drafting a second report which will deal with the essential elements of housing codes, based on consultation with public health, building, and housing officials throughout the country.

The important problems of overcrowding and its regulation, including the formulation of sound standards for room occupancy, are being intensively studied by the Subcommittee on Standards of Occupancy, which is receiving substantial assistance from the leading federal agencies in this field.

The Subcommittee on Household

\* Report of the Subcommittee to the Committee on Research and Standards.

Operation is developing a plan to supply housing project managers with a package-library of coördinated bulletins on various aspects of household operation. This work is being done in coöperation with the National Association of Housing Officials, the U. S. Housing Authority, and the American Home Economics Association.

A popular handbook on prevention of home accidents is being prepared by the Subcommittee on Home Safety.

Studies in the formative stage have been reported to the general and executive committees by the research Subcommittees on Illumination, Home Sanitation, and Recreational Facilities.

Activities other than those of the research subcommittees have been conducted by the Chairman and committee staff. The committee's basic field studies having been completed, the former Field Secretary has been replaced by a general Research Assistant, who is assigned to investigative work for several of the subcommittees.

This year for the third time the committee arranged the program for the Housing Section of the Annual Conference of the Milbank Memorial Fund. Through the courtesy of the Fund, publication is being arranged for the papers delivered at that meeting, together with papers presented at other recent meetings of the committee.

The committee assisted in arranging a discussion panel at a session of the Health Officers Section during the 1940 Association meeting on the topic, "How Far Should Housing Concern the Health Department?" Since that meeting, a housing committee of the Health Officers Section has been established. The chairman of that committee (Dr. Huntington Williams) has

recently been added to the membership of the Committee on the Hygiene of Housing.

The committee has worked with the Connecticut Department of Health for the establishment in that department of a full-time housing unit, and is now rendering regular consulting service to the housing unit, an arrangement which seems to offer a major opportunity of practical service to active public health officials. Fees for this service—the first governmental contribution to the committee's budget—are scheduled to provide about one-seventh of its general funds for 1941. Two principal activities for the next few months are being recommended to the department: an intensive study of state and local housing regulations, with a view to strengthening and modernizing these; and a series of sample housing surveys in several communities of the state (using procedures developed by the committee) to characterize and measure the housing problems which confront the public health official.

A popular exhibit on *Housing for Health* was conducted for the second year in the Hall of Medicine and Public Health at the New York World's Fair.

Grateful acknowledgment is made of the financial support of the committee's work by the Milbank Memorial Fund and the John B. Pierce Foundation. The committee wishes to record its warm appreciation of the encouragement and support which its work has received during the year from the Committee on Research and Standards.

C.-E. A. WINSLOW, *Chairman*  
 ROLLO H. BRITTEN, *Secretary*  
 ALLAN A. TWICHELL, *Technical Secretary*

# Functions of Public Health Engineering Personnel\*

## *Engineering Section*

THE purpose of this committee is twofold: (1) To define more clearly the proper functions of public health engineers and other personnel in environmental sanitation. (2) To suggest methods for more effective co-ordination and supervision of activities in the field of public health engineering.

In its broader aspects this assignment includes the entire sanitation program of federal, state, and local health departments, and numerous related services of other agencies. It is complicated by the wide variety of physical, financial, social, and governmental conditions that exist in this country. Definition of the desirable functions of personnel is closely related to the difficult problems of educational and personal qualifications. The co-ordination and supervision of sanitation activities is concerned with major aspects of public health practice and personnel management.

An objective approach to these complex questions has been difficult. No adequate data are available to permit an analysis of the volume and efficiency of public health engineering activities in relation to the type of service, the qualifications of personnel, and the methods of administration employed.

Therefore, it has been necessary to depend largely upon the knowledge and experience of the members of the committee. However, after publication of a progress report in the 1939-1940 *Year Book*,<sup>1</sup> numerous individual views and suggestions were received from other members of the Association. The present report represents the general consensus of opinion as nearly as it may be determined.

After a review of the scope of the assignment and of the possible methods of approach it was decided that, at present, the committee would:

1. Confine its attention to the activities of full-time health departments.
2. Consider these problems on the basis of available information, although a need for further administrative research in the field of environmental sanitation is recognized.
3. Accept the reports of the Committee on Professional Education in regard to educational qualifications of public health engineers, sanitarians, and sub-professional field personnel in sanitation (sanitarian-assistants) merely as a basis for the definition of personnel functions.<sup>2</sup>
4. Include in the present report:
  - a. A brief outline and discussion of certain fundamental considerations pertinent to the assignment as a whole.
  - b. A general classification of the functions of public health engineering personnel.
  - c. General conclusions regarding the allocation of functions in relation to the educational and other qualifications of personnel.

---

\* Report of Committee on Co-ordination of Public Health Engineering Activities.

COMMITTEE ON CO-ORDINATION OF PUBLIC HEALTH ENGINEERING ACTIVITIES. Organized 1938. Published report: *Year Book* 1939-1940.



## FUNDAMENTAL CONSIDERATIONS

*A. Nature and Scope of Public Health Engineering*

1. A number of different services are employed in the maintenance of public health, particularly those of two professions:
  - a. Medical health service which is concerned especially with the effects of environmental conditions upon the human organism and the adjustment of man to his environment.
  - b. Engineering health service which utilizes the materials and forces of nature in the adjustment of the environment to man. When employed primarily for the protection and promotion of public health this specialized branch of engineering is termed "public health engineering."
2. Public health engineering includes the public health aspects of all types of environmental conditions whose control is based upon engineering principles regardless of the magnitude or technical difficulty of the individual problems involved.
3. All procedures of federal, state, and local health departments that depend upon engineering materials or methods should be considered as public health engineering activities.

*Comments*—In the evolutionary development of public health practice there has been a tendency to classify environmental sanitation problems as "engineering" or "non-engineering." Frequently the methods of approach to such problems have been selected on the basis of their magnitude, the extent of their influence upon public health, or the type of personnel immediately available. Such unscientific reasoning leads to inconsistent conclusions. For example, a sewerage system for a town of 10,000 people might be classified as engineering, while privies and small septic tanks to serve the same number of people in an unsewered area might be considered non-engineering. Yet the disposal of sewage and excreta in the two areas depends upon the same scientific principles, and employs practically the same materials of construction; the total cost is similar, and about the same number of people would be affected.

On the basis of unit size some administrators have decided that the water supply of a city is engineering while the milk supply is not; or that a large water supply requires public health engineering supervision but that a large number of small water supplies do not. The fallacy of such classifications is obvious.

The successful technical and administrative solution of many so-called "small" problems is very difficult. Much money has been wasted on sanitation structures and activities that did not conform to sound engineering practice. As a prerequisite to effective coördination and supervision of sanitation services, health officers, engineers, and others in administrative positions must recognize that all environmental sanitation problems—whether small or large, simple or complicated—are fundamentally engineering in character. They can then follow well established principles of administration to develop the best organization for the solution of these problems with the facilities available.

*B. Personnel*

1. A basic element in professional education is the development of a mind which is trained to meet individual problems in an original manner. Because of his fundamental training in engineering, the public health engineer is prepared in the analysis and control of environmental health problems
2. For economy and efficiency any extensive professional organization must supplement the services of its professional workers by the employment of trainees and technicians or individuals who are proficient in other occupations. The need for special training of such supplementary workers and their efficiency in the performance of well defined duties, under adequate supervision, have been amply demonstrated in various fields of medical and engineering endeavor. Supplementary personnel in environmental sanitation should not be given assignments which depend upon engineering knowledge and experience they do not possess.
3. The preparation of public health personnel

should include opportunities for field experience under supervision. First-hand knowledge of procedures is important. Valuable field experience for public health engineers can be provided by their employment for the supplementary activities mentioned above as a method of preparation for broader responsibilities.

*Comments*—In the selection of personnel for particular functions, basic training as well as specialized ability should be considered. The respective advantages and also the limitations of public health engineers and sanitation technicians in the public health program should be appreciated. There is still confusion of thought in regard to these values. Such confusion has been practically eliminated in other fields where professional supervision is well established. In a hospital, for example, physicians, nurses, technicians, pharmacists, dietitians, and others work together without uncertainty as to the essential rôle of each in the diagnosis and treatment of disease. On a large construction project skilled laborers, foremen, the superintendent of construction, and the resident engineer may perform specified functions efficiently but only under adequate supervision and within the limits of their training and experience. The same basic principles should be followed in the organization of public health engineering services.

### C. Administration and Supervision

1. All public health engineering activities should be under the supervision of a competent public health engineer who should be directly responsible to the administrative health officer for all matters which affect their professional integrity.
2. The extent to which particular activities should be performed by technicians or other supplementary personnel and the details of administrative arrangement to provide for engineering supervision will depend upon the nature of the problem, the feasibility of specifying definite procedures, and the capabilities of individual workers.
3. The administration of state and local health departments should provide for consultation

and interchanges of service and information so as to maintain coordination of the work of public health engineering divisions and of other administrative units.

*Comments*—In order to provide for effective supervision of all aspects of environmental sanitation, certain major administrative functions must be delegated by health officers to their directors of public health engineering divisions. Obviously these should include administration of the division office and the approval of standards and technics. Also they should include technical planning and supervision of all types of sanitation work, and appraisal of the qualifications, training facilities, and procedures of sanitation personnel. The assistance and influence of public health engineers should be further extended and utilized by consultations and joint services with other divisions. In this way the engineering aspects of the entire public health program can be adequately supervised without confusion or overlapping of administrative responsibility.

## DEFINITION OF FUNCTIONS OF PUBLIC HEALTH ENGINEERING PERSONNEL

### A. Classification of Activities

Outlines of the activities embraced by environmental sanitation have been suggested repeatedly, three of which are cited at the end of this report.<sup>2, 3, 4</sup>

They are essentially classified summaries of environmental problems. Although instructive they do not suggest specifically the nature of the activities or the qualifications required.

### B. Classification of Functions

The following general outline of the principal functions of public health engineering personnel is suggested. A classification in this manner is more amenable to study in relation to the need for particular qualifications.

1. Administration—(Responsibility as delegated by health officers or boards of health).

- a. Executive—e.g.: Management of office; direction of personnel; budgets; purchases; etc.
  - b. Professional—e.g.: Analysis of problems; planning of work; approval of standards and procedures; appraisal of qualifications and performance of personnel; professional guidance of personnel; development of codes, regulations and other legislation; etc.
  2. Supervision of Environmental Conditions—(Implies mandatory regulation).
    - a. General—e.g.: Throughout an area or in general terms.
    - b. Specific—e.g.: Regarding particular problems and involving specific details, etc.
  3. Consultation—(Implies conferences, advice and stimulation of voluntary action).
    - a. General—e.g.: Group approach regarding broad problems; interpretations; etc.
    - b. Specific—e.g.: Regarding individual problems and specific details, etc.
  4. Promotion—(Implies specific "sales objectives" not mere educational efforts).
    - a. General—e.g.: Group approach through publicity or meetings; promotion of legislation or appropriations; etc.
    - b. Specific—e.g.: Individual projects or items of improvement; compliance with specific requirements; etc.
  5. Education—(Includes popular health instruction and field instruction of public health personnel).
    - a. General—e.g.: Assisting in health education program; preparation of material; field instruction of groups of student public health personnel; etc.
    - b. Specific—e.g.: Individual approach in training workmen, interpreting plans or explaining legislation; training student personnel in particular technics; etc.
  6. Investigations—(Includes technical studies, special investigations and sanitary inspection).
    - a. Fundamental Research—e.g.: Coöperative research projects regarding unknown factors or influences, etc.
    - b. Practical Research—e.g.: Study of known or accepted data to determine applicability in particular situation; etc.
    - c. Surveys—e.g.: To determine details of sanitation service required or afforded in particular jurisdictions; to determine status of sanitation in given areas; etc.
    - d. Routine—e.g.: Sanitary engineering investigations; sanitary inspections; etc.
  7. Design—(Includes public health features and sometimes all details of structures, machines and equipment that are of importance to health).
    - a. Original—e.g.: Standard plans for privies, dairies or screens; small engineering projects; water supply and sewerage of state or similar governmental institutions; etc.
    - b. Review and Approval—e.g.: Water works; sewerage systems; ventilation systems; buildings; impounded waters; milk plants; food plants; etc.
  8. Office—(Non-administrative).
    - a. Clerical.
    - b. Drafting.
    - c. Miscellaneous.
- C. General Conclusions Regarding Allocation of Functions*
1. Only fully qualified and experienced public health engineers should be directly responsible for:
    - a. Administrative direction of major divisions of public health engineering service (responsible directly to administrative health officer).
    - b. A controlling influence in the selection, training, supervision and advancement of all grades of public health engineers and sanitation technicians.
    - c. Approval of policies, codes or manuals prescribing standards, procedures and technics to be applied in public health engineering activities.
    - d. General supervision of all phases of environmental sanitation.
    - e. Specific activities requiring an engineering background and also the exercise of authoritative judgment in regard to consultation, promotion, education, investigation or design.
  2. Only properly qualified engineers with public health engineering training and experience adequate for their responsibilities should be employed for:
    - a. Acting or assistant directors of major divisions of state or local public health engineering service.
    - b. Direct supervision of plants or conditions which requires technical engineering knowledge.
    - c. Engineering investigations, surveys and research and the preparation of reports and designs pertinent thereto.
    - d. Technical supervision and appraisal of

state and local public health engineering activities.

- e. Analysis of designs and tentative conclusions regarding their adoption or approval.
3. Either relatively inexperienced graduate engineers or sanitation technicians with qualifications commensurate to their duties but only with adequate supervision, guidance, and assistance by public health engineers may be employed for:
  - a. Supervision of minor sanitation problems in the smaller units of public health organization where fully qualified public health engineers cannot be provided on a full-time basis.
  - b. Any activities which do not require proficiency in engineering and in which the engineering considerations and conservative procedures can be defined in specific terms for practically all conditions which will be encountered.
  - c. Routine inspections, collection of specific items of information, collection of specimens, and other activities which are time consuming and amenable to quite exact definitions and instructions.
  - d. Educational and promotional work through frequent contacts with individuals and small groups of people.

#### CLOSING COMMENTS

This report is intended only as a summary of the more important elements in the problems under consideration. It is hoped that further thought and discussion may be stimulated. More definite suggestions regarding methods of coordination are obviously needed.

Comprehensive research studies of the administrative problems suggested in this report would be most valuable. More exact knowledge of the governing factors, present deficiencies, and future needs in the supervision of environmental sanitation services is necessary

as a basis for analysis and improvement. Last year this committee suggested that the U. S. Public Health Service should be urged to study the fundamentals of these problems in a representative number of state and local health departments. Such a program has been begun, and research studies of municipal sanitation are now being conducted by the National Institute of Health in a limited number of cities. If this program can be continued and expanded to include a typical cross-section of public health engineering practice in health departments throughout the country it may be expected to have a beneficial influence upon the organization and effectiveness of environmental sanitation in the future.

#### REFERENCES

1. Functions of Public Health Engineering Personnel (Progress Report). *Year Book*, 1939-1940, Supp. *A.J.P.H.*, 27, 2:52-56 (Feb.), 1940.
2. Educational Qualifications of Personnel in Environmental Sanitation, American Public Health Association, New York (Reports of Committee on Professional Education—Reprint), 1939.
3. Hyde, C. G. The Trained Public Health Engineer in Public Health Departments. *A.J.P.H.*, 26, 7:697-710 (July), 1936.
4. McLaughlin, A. J. A Basic Program of Sanitation. *Health Officer* (U.S.P.H.S.), 3, 12:411-417 (Apr.), 1939.

ROY J. MORTON, *Chairman*

H. G. BAITY

G. M. FAIR

A. H. FLETCHER

H. A. KROEZE

WARREN J. SCOTT

HAROLD A. YOUNG

*Consultants—Health Officers Section*

EARLE G. BROWN, M.D.

R. H. MARKWITH, M.D.

# Municipal Public Health Engineering

## *Engineering Section*

IN a previous report of this committee, presented in 1938, it was stated that only one-fourth of the 211 cities with a population of 50,000 or over then employed public health engineers, and that of the 37 largest cities with a population of 250,000 or over, only 14 had public health engineers in their health departments. This situation, we believe, justified the most serious consideration of the members of the Engineering Section and of health officials generally. Although there has been some advance in the extent of engineering service in health departments in the past two years, conditions continue to be most unsatisfactory. Many large cities are said to have considered the addition of such engineering personnel to their departments of health, but few have progressed beyond the discussion stage.

It is believed that it will be worth while for this committee to present to the Engineering Section some of the aspects of this problem, which is now made more urgent by the present emergencies and defense preparations. The promotion by municipal health officers of an engineering service is retarded and confused through their failure to recognize, first, the purpose and value of thorough technical work in environmental sanitation, and, second, the fact that such work to be effective must have engineering direction. Health officers will readily agree that public health work takes in much more than the medical and nursing phases of pre-

ventive medicine. They may generally accept the watchword of Whipple that "public health is concerned not only with disease, but with all of the environmental conditions which make for wholesome, decent and comfortable living." (Whipple *State Sanitation*, vol. 1, page 218.) Yet, it is all too obvious in municipal health department reports that many cities have left important sanitary functions to the haphazard efforts of Topsy-like bureaus or personnel, which carry on chiefly a nuisance inspection instead of a disease prevention program, as aptly stated by Chapin. These bureaus repeat static routines year after year without benefit of critical evaluation or improved direction.

When the larger aspects of environmental health work rise to plague a municipal health officer, he is apt to feel that he can properly turn to and place responsibility on the state sanitary engineering division, or shift it to the engineering personnel of the water, sewage, or garbage disposal departments, as the case may be. As a simple illustration, let us consider a community of several hundred thousand population with a well operated water department, maintaining an elaborate treatment works and distribution system. There may be an engineer, and a technically supervised laboratory attached to this water department. Is the situation adequately covered, from the standpoint of the health of the local citizens, if the general supervision of the supply and

the responsibility for a safe water are left to the occasional investigation and supervision of the state department of health and the local control by the water department? The weakness in this situation is obvious. State departments of health, in general, exercise little more than advisory functions in the operation and control of the larger municipal water supplies. Instances are plentiful where state departments have repeatedly reported unsatisfactory local water conditions, condemned sources and treatment practices, and yet many years and even decades pass before effective local action is secured. It is also to be recognized that a state department of health cannot, from a practical standpoint, assume complete responsibility for the control of operation and the safety of such a water supply, and that to do so would be an improper encroachment upon a basic duty of the local department of health. The state functions have been principally the investigation of situations requiring improvements or change, and some control in the general interest over the selection of sources and the degree of treatment to be provided.

Turning to the local situation with respect to the water department, we find that the health and safety aspects of the water supply are likely to be submerged by the many other problems of a water department. Though these departments, in the great majority of cases, have competent and qualified technical employees familiar with water purification, it is still a fact that many of these departments, in the larger cities of the country, hesitate to report publicly on the health aspects of the water supply. They also find that improvements in the sanitary protection and safety of the water supply have to compete with the demands for other water improvements, and involve a struggle with the restrictions and limitations of budget officials. Rarely do we find a

water department, confronted with the need of improved sanitary protection for its water supply, that will present its arguments forcefully for public hearing and discussion. The health officer, without an engineering division, finds it difficult to evaluate and give technical support to water supply improvements, and therefore tends to ignore the responsibility or to shift it away from the health department to other state or local governmental agencies.

This situation is entirely changed when the health officer has on his staff properly qualified public health engineers, maintaining a continuing supervisory check on the water supply in all its aspects. When the necessity for changes or improvements becomes apparent, the health officer is in a position to discharge his proper responsibility by advising the mayor and the community of the public health issues involved. It is not, of course, suggested that the engineering division of a local health department replace or become a substitute for the water department control of its operation, nor for the investigative and consulting services of the state health department.

A pertinent comment on a newer phase of the problem of water supply safety, which should clarify the health department's function in this field, is presented in the recent important article by Paul Hansen, entitled "Active Problems in Water Purification," appearing in the July, 1940, *Journal of the American Water Works Association*, page 1118.

A review of the literature of water purification practice during the past few years and contact with many men active in the field indicate active interest in a wide range of subjects, but the dominant note that runs through most of the discussion is the serious realization that tightening of control is necessary to insure a safe and satisfactory water supply at all times and at all places on the distribution system. A series of events has been instrumental in bringing about this attitude.

The events Mr. Hansen refers to further in his article are, chiefly, new and perplexing wide-scale outbreaks of typhoid and gastroenteritis involving water supplies, which compel some revaluation of previous standards for water supply control.

The disregard or short-circuiting of local health officials is even more common in other phases of the environmental health programs of communities, such as in sewage disposal, garbage disposal, housing, industrial hygiene, malaria control, etc. It is believed that the agencies, local and state, which are carrying on these programs, would generally welcome the participation in such activities of the local health department, manned with qualified public health engineering personnel, since no other agency can so fully and broadly represent the entire public health interests of a city as its health department. This department should be influential in determining the priority or necessity of various parts of any large city improvement or rehabilitation program.

The multitude of complex and intensive alterations man makes in his environment all affect the health of a community. Therefore it is not easy for those outside the immediate technical field to visualize the activities or methods to be pursued in carrying out an environmental sanitation program even in its major aspects. The health department has a primary responsibility for shaping the more significant environmental improvements, and thereafter making certain that they are properly maintained and operated for the greatest benefit to the health and comfort of the citizens. This department should be the chief governmental unit to work with civic agencies in educating citizens to appreciate, support, and use these environmental improvements. Above all, it should be the health department's job to insure a continuing inspection, an effective control,

and rational adjustments from time to time of the community environmental activities and facilities, from a health and comfort standpoint. Significantly, there are current demonstrations of the successful carrying out of such functions by local health departments following the inclusion of public health engineers in their departments, notably in Chicago, Detroit, Memphis, New York, and several of the larger urban counties.

The immense defense program which this country is now undertaking will bring a multitude of environmental health problems—such as increased use of community sanitary facilities, water supply, sewage disposal, garbage disposal, insect control—involved in the location of nearby military camps, or new or enlarged industrial plants, etc. New and greater problems connected with housing, room occupancy, insect control, food control, industrial hygiene; problems related to new chemical products and industrial processes, need to be given the timely attention of the health department. The abnormal shifting of personnel operating the sanitary facilities of a community will necessitate a closer check by the health department on the maintenance of these facilities to protect public health and safety. The experience of cities located near great industrial operations or army cantonments during the last war conclusively showed that engineers functioning as local municipal health engineers were of incalculable value in providing health safeguards for the army camps, industrial plants, and the normal local population.

It is the conviction of this committee that the larger cities of this country have no time to lose in establishing an adequate engineering staff in their health departments. This committee also believes that the dominant health agencies, including federal and state departments

and the national associations concerned with public health, would make an immense contribution, both to national preparedness and to general health protection, by a positive promotion at once of such engineering service in the larger cities of this country. Among the specific measures proposed by this committee are the following:

1. An early conference to be called by the U. S. Public Health Service, or by the U. S. Conference of Mayors, on the matter of the cities of this country assuring more effective health protection, by increased sanitary supervision of the large urban water supplies and all other sanitary facilities.

2. Promotion by governmental agencies, particularly the U. S. Public Health Service, as during the last war, of a balanced local health department organization, necessarily including an engineering division, wherever defense plants or military camps are to be located in the immediate vicinity.

3. Coöperation between the federal government and state health departments in making available to the larger cities, for establishing or strengthening their environmental health program, a share of the federal funds appropriated for local and state health work, but not now being allocated to cities for such purposes.

4. Extension by the U. S. Public Health Service of its activities in making surveys, collecting data, and in consultations and development of standards for local environmental health work. The study reported by Leslie Frank in the August 2, 1940, issue of *Public Health Reports*, on Disease Outbreaks Resulting from Faulty Environmental Sanitation, constitutes a revealing and valuable start in this direction.

5. The persistent stimulation of interest among state and city health officers in municipal engineering service by the dissemination through every proper channel of reports and information bearing upon the proper functions of engineers and the essential nature of such engineering service in any health department undertaking to discharge fully its responsibilities in the protection and improvement of the public health.

SOL PINCUS, *Chairman*

JAMES L. BARRON

JOEL I. CONNOLLY

AIMÉ COUSINEAU

ALFRED H. FLETCHER

ARTHUR E. GORMAN

F. GARDNER LEGG, JR.

WILLIAM T. INGRAM

CAPT. HENRY C. LANE

(on military leave)



# Shellfish

## *Engineering Section*

THE committee held a meeting at New Haven, Conn., on August 2, 1940, at which five committee members and thirteen guests were present. The following papers were presented and discussed:

1. Preliminary Progress Report on the Work at Craney Island Laboratory, National Institute of Health—Dr. L. A. Sandholzer
2. Unofficial Progress Report from Laboratory Section Committee on Shellfish—C. B. Kelly
3. Progress Report on the Shellfish Code—A. P. Miller
4. Sources and Quantities of Shellfish Entering New York City—Sol Pincus

The Shellfish Committee has pointed out repeatedly in its reports to this Section that progress in shellfish sanitation would be more rapid if a more satisfactory method for examining shellfish and shellfish waters could be found.

Last year the committee adopted the following resolution which, after being approved by the Section Council, was brought to the attention of the Surgeon General of the U. S. Public Health Service by the Executive Secretary of the American Public Health Association:

In view of the fact that there are many important problems in connection with shellfish sanitation that require intensive study, it is the consensus of opinion of this committee that the U. S. Public Health Service should undertake investigations in this field and should endeavor to correlate the studies being made by state and other agencies.

A similar resolution was adopted by the Conference of State and Provincial

Health Authorities of North America at their 1939 meeting, and about February 1, 1940, a small research staff financed jointly by the State of Virginia and the U. S. Public Health Service began laboratory studies in the Virginia State Health Department shellfish laboratory at Norfolk, Va. Subsequently, a separate laboratory was opened by the National Institute of Health on Craney Island near Norfolk, Va., on U. S. Public Health Service property formerly used by the Foreign Quarantine Division. Thus, after more than four years of urging, it appears probable that a thorough reëxamination of laboratory methods for the examination of shellfish and shellfish waters will be made.

The Laboratory Section committee and this committee are both much interested in the outcome of this research work, and the personnel of both committees have contributed suggestions as to the problems which should be investigated. Upon the development of a laboratory method whose validity is beyond question depends the rapid development and general use of shellfish cleansing plants.

In addition to tests to determine the presence of the coli-aerogenes group, it appears to many that a standard colony count would be of value as an index of general sanitation and refrigeration.

This committee in its 1938 report stated that while it did not believe the time was ripe for requiring that all shellfish intended for the half-shell trade

COMMITTEE ON SHELLFISH (Engineering Section)

Organized 1925. Published reports: *Year Books* 1934-1935, 1935-1936, 1936-1937, 1937-1938, 1938-1939, 1939-1940

should, after having been taken from waters meeting certain minimum standards of cleanliness, be passed through cleansing and conditioning tanks, nevertheless, pointed out that this goal should be kept in mind. Laboratory methods now employed demonstrate the improvement that can be brought about in shellfish cleansing and conditioning plants, and many years' experience with the output from such plants here and abroad indicate that no illness has resulted from the consumption of shellfish passed through cleansing plants. The great sanitary advantage of such a plant lies in the fact that shellfish are kept under rigidly controlled conditions for a period immediately preceding shipment to market.

Some progress has been made by a small committee of Public Health Service engineers in amplifying the U. S. Public Health Service *Minimum Requirements* by writing for each paragraph of the *Requirements* two additional paragraphs, one citing the public health reason for the requirement, and the other stating what constitutes satisfactory compliance, thus following in some respects the form followed in the *Standard Milk Code*. This should make for uniform enforcement of requirements throughout the industry, in that shellfish inspectors will be able to determine definitely whether or not compliance is attained by merely referring to the paragraph defining satisfactory compliance for each item of sanitation.

The items of sanitation included in the requirements, and the weights tentatively assigned to each item are as shown below. These weights were obtained by averaging the weights assigned independently by ten public health workers engaged in shellfish sanitation work. It is believed that by using these weights suitable rating forms can be developed which will make it possible to evaluate more scientifically the effec-

tiveness of sanitary control over the shellfish industry exercised in a given state.

Item	Average Weight (To nearest whole number)
Sanitary and bacteriological surveys of shellfish areas.....	21
Relaying from closed areas to approved areas .....	4
Policing of closed areas.....	7
Depletion (removal of shellfish of market size from closed areas by state) .....	5
Boats .....	3
Body excreta of shell-fishermen kept out of shellfish waters..	5
Carriers excluded from tonging or shucking operations .....	7
Conditioning of clean shellfish for market .....	5
Cleansing of shellfish from moderately polluted waters ....	5
Floating shellfish in natural waters .....	10
Wet storage of shellfish.....	7
Dry storage of shellfish .....	3
Shucking shellfish .....	8
Packing shellfish .....	10
	<hr/> 100

It is interesting to note from this evaluation that the condition of shellfish shucking houses constitutes only 18 per cent of the shellfish sanitation problem, in the opinion of the evaluators. This item receives very much more attention in many areas than this evaluation indicates it should when the whole problem is considered.

The score sheet for rating shucking houses presented in last year's report has been used for comparative purposes during the year in some areas. A form for rating concerns handling and marketing shell stock only, and a form for rating the control work on a state-wide basis are being given consideration by members of the committee.

It is hoped that during the coming year progress will be made in developing the rating forms needed in evaluating the degree of state compliance with the

requirements, in order to test the usefulness of the forms.

In the shellfish research laboratory there will probably be made some basic bacteriological investigations under controlled conditions, with a view to determining whether the use of the coli-aerogenes group shall be continued as the index of pollution of shellfish or shellfish waters. It is hoped that a progress report on these studies can be made by the National Institute of Health at next year's meeting, if not sooner.

Figures showing the volume of shellfish entering our largest city and the occurrence of typhoid fever ascribed to shellfish in recent years were presented to the committee by Sol Pincus, Deputy Commissioner of Health of New York City. They show that during the 2½ year period ending June 30, 1940, a total of 1,120,000 bushels of shellfish in the shell were shipped into New York City from the ten seacoast states from Maine to North Carolina, both inclusive. About 882,000 bushels, or slightly more

than 78 per cent, came from New York State. Hard clams made up more than 722,000 bushels, or nearly two-thirds of all shell stock.

During the same period, some 271,000 gallons of shucked clams and oysters were shipped into our largest city, about 202,000 gallons, or nearly 75 per cent, originating in New York State.

Typhoid fever ascribed to shellfish has been decreasing since 1933.

A resolution on the death of Stephen DeMerritt Gage, formerly a member of this committee, was presented by the committee, and adopted by the Engineering Section.

L. M. FISHER, *Chairman*  
M. H. BIDWELL  
J. B. GLANCY  
R. M. HARRIS  
RICHARD MESSER  
SOL PINCUS  
R. E. TARBETT  
EDWARD WRIGHT  
C. T. BUTTERFIELD, *Adviser*

# Results of a Survey of Water Supply Control Practices\*

## Engineering Section

PREVIOUS studies by the committee have emphasized certain weaknesses in water supply control practices in relation to the problem of water-borne outbreaks. To secure more accurate factual information concerning these practices and to focus attention upon the needs for improvement, the committee this year presents the results of a questionnaire survey of the practices in effect in 410 municipalities in the United States. Questionnaires were distributed to 1,490 water superintendents and the replies representing a 28 per cent return were well distributed according to the size and geographical location of the municipalities. The essential findings are discussed below, and some of the more significant tables included in the report are appended.

### I. WATER AS DELIVERED INTO DISTRIBUTING SYSTEMS

Within reasonable limits, water should be free of coliform organisms both for assurance as to safety and to give added significance to results of analyses upon consumer tap samples; otherwise presence of coliform organisms in tap samples may fail to draw attention to serious cases of localized contamination resulting from back siphonage, etc.

For untreated supplies there should

be overwhelming evidence that treatment is unnecessary, confirmed by an adequate analytical record. For treated supplies there should be a sufficient operating and analytical record that water as delivered into systems has been of safe quality.

*Frequency of Analyses*—From the replies Table 2 (given here) has been prepared. Municipalities with numbers of analyses below or above the indicated medians may be considered below or above normal respectively.

Attention is directed to the small number of analyses made upon chlorinated supplies in comparison with filtered supplies.

About 10 per cent of the replies indicated that sampling programs in effect were insufficient to give reasonable assurance as to the quality of water as delivered into the systems.

*Local Water Plant Laboratories*—Classified as to type and treatment of supplies, the following shows the percentage of places canvassed which maintain local water plant laboratories:

Type of Supplies	Treatment	Per cent with Local Plant Laboratories
Ground Water	None	1.3
	Disinfection	25.8
	Filtration, Iron removal, etc.	54.5
Surface Water	None	0.0
	Disinfection	43.1
	Filtration	80.2

\* Abstract of Report of the Committee on Water Supply.

TABLE 2  
Frequencies of Water Analyses in 410 Municipalities  
(Water as Delivered Into Distributing Systems)

Type of Supply	Treatment of Supply	Population Group	Number of Samples Examined Annually		
			Minimum	Median	Maximum
Ground Water	None	Over 100,000	365	x	416
		50,000-100,000	50	50	192
		25,000- 50,000	4	48	200
		15,000- 25,000	2	12	24
		10,000- 15,000	0	12	40
		5,000- 10,000	0	6	33
		2,500- 5,000	0	12	52
		Under 2,500	0	4	12
Ground Water	Chlorination or Chlorine Ammonia Treatment	Over 100,000	60	145	2,040
		50,000-100,000	300	700	1,500
		25,000- 50,000	3	72	750
		15,000- 25,000	1	52	200
		10,000- 15,000	0	324	365
		5,000- 10,000	1	12	417
		2,500- 5,000	0	8	12
		Under 2,500	4	12	60
Ground Water	Softening Iron Removal or Filtration without Disinfection in Some Instances	Over 100,000	417	417	417
		50,000-100,000	1	60	625
		25,000- 50,000	0	x	365
		15,000- 25,000	58	225	365
		10,000- 15,000	52	52	52
		5,000- 10,000	24	60	1,452
		2,500- 5,000	12	36	425
Surface Water	None	Over 100,000	0	x	0
		2,500- 5,000	6	6	8
		Under 2,500	Few	Few	Few
Surface Water	Chlorination or Chlorine Ammonia Treatment	Over 100,000	0	310	5,482
		50,000-100,000	50	126	1,340
		25,000- 50,000	1	210	1,417
		15,000- 25,000	2	24	365
		10,000- 15,000	12	52	165
		5,000- 10,000	0	26	300
		2,500- 5,000	6	12	24
		Under 2,500	0	24	52
Surface Water	Filtration and Chlorine or Chlorine Ammonia	Over 100,000	365	1,144	8,232
		50,000-100,000	132	365	4,576
		25,000- 50,000	0	365	8,851
		15,000- 25,000	12	365	2,256
		10,000- 15,000	0	300	573
		5,000- 10,000	12	118	1,273
		2,500- 5,000	0	200	940
		Under 2,500	12	36	377

Classified as to size the following shows the percentage of places canvassed which maintain local water plant laboratories:

Population Group	Per cent with Local Plant Laboratories
Over 100,000	79.0
50,000 to 100,000	76.6
25,000 to 50,000	67.7
15,000 to 25,000	56.2
10,000 to 15,000	56.8
5,000 to 10,000	26.6
2,500 to 5,000	16.4
Under 2,500	5.7

A real need is indicated for additional local water plant laboratories. If impracticable to provide, municipalities should make other arrangements for necessary laboratory service.

## II. WATER AS READMITTED TO DISTRIBUTING SYSTEMS AFTER EXPOSURE TO SECONDARY CONTAMINATION IN OPEN RESERVOIRS

Of 410 places reporting, 51 have the problem of possible secondary contami-

nation in open reservoirs. Forty of these are places with over 50,000 population. In 20, no treatment is provided. Of the 11 places with less than 50,000 population, all but 3 maintain treatment to counteract the effects of possible secondary contamination. The smaller communities are doing more to meet this problem than the larger communities.

In some places the entrance of chironomus larvae or other visible organisms into the distributing system takes place in open reservoirs, and may drive consumers to the use of unapproved or unsafe private supplies.

Serious thought should be given to providing supplemental treatment of water flowing from open reservoirs. *In this connection the possibility of sabotage and the contamination of water in open reservoirs with cultures of pathogenic organisms or poisons needs to be kept predominantly in mind in view of present world conditions.*

*Frequency of Analyses*—Much less frequent than upon samples representative of water as delivered into systems.

### III. WATER AS DELIVERED TO CONSUMERS

The data received on the items selected for study indicate that much remains to be done before water as drawn from the taps in all communities throughout the country is of assured safe sanitary quality. The problem of

water-borne outbreaks is still a challenge, notwithstanding that under improvements constantly being made, the problem is considerably diminished in comparison with its magnitude of only a few years ago.

Even though water may be safe when delivered into the system, it may not remain so due to such causes as open reservoirs, back siphonage, cross-connections, and repairs to the systems. Many possibilities exist for reducing the dangers arising from such conditions.

*Frequency of Analyses*—An accurate and sufficient record of the quality of water as actually delivered to consumers, measured at numerous and well distributed taps over the distributing system, is of extreme importance. If such analyses should suddenly point to localized contamination, the chances are fair that the source of contamination can be discovered and promptly eliminated, or other action taken to prevent the development of a disease outbreak. Without such a record a serious condition may go on undetected for years.

While some municipalities provide for examination of a large number of tap samples, there are many where no samples are taken or where the number of samples would seem to be wholly inadequate.

That inadequate sampling from distributing systems is a common failing is indicated by the data of Table 6 (in-

TABLE 6  
*Frequencies of Water Analyses in 410 Municipalities  
(Water as Delivered at Consumer Taps)*

Population Group	Number of Places Reporting	Number of Samples Examined Annually		
		Minimum	Median	Maximum
Over 100,000	62	None	500-700	> 5,000
50,000-100,000	47	None	200-300	1,500-2,000
25,000- 50,000	65	None	100	4,000-5,000
15,000- 25,000	48	None	24	1,500-2,000
10,000- 15,000	38	None	24	700-1,000
5,000- 10,000	60	None	24	300- 400
2,500- 5,000	55	None	24	1,000-1,500
Under 2,500	35	None	12	100- 200
Total	410			

cluded here). Attention is directed to the fact that there are several communities in each population group which collect no samples, and that the median numbers of samples collected are extremely low. Some small communities have a better record of water quality than many of the large communities.

An urgent need is indicated for great extension of sampling programs over distributing systems.

*Localized Contamination*—This occurs more often than is generally known, as shown by Table 7. That cases of localized contamination have been indicated by nearly one-third of the replies is truly significant. Back siphonage, repairs to systems, and cross-connections are among the more important causes.

Other opportunities exist for improvement which will reduce water shut-offs to a minimum and provide for a satisfactory supply of water for fire purposes without creating greatly reduced pressures or negative heads. Attention is directed to the need for providing for disinfection of mains at the time extensions, repairs, or main cleaning operations are carried on.

There is need for extending control over water distributing systems to include house connections, service piping, and water connections to plumbing fixtures, and there is much merit to the idea that water supply authorities should have control over these matters.

*Residual Chlorine in Distributing Systems*—There has been a growing tendency to treat sufficiently so that a

TABLE 7  
*Localized Contamination of Distributing Systems—1935 to 1940*

Population Group	Total Number of Places Reporting	Places Reporting Localized Contamination		Number of Places Attributing Contamination to					
				Back Siphonage	Leakage from Sewers	Repair Work on System	Cross-connections	Ammonia from Refrigeration Plants	Other Causes
		Total No.	Per cent						
Over 100,000	62	26	41.9	8	x	8	7	1	2
50,000-100,000	47	17	36.2	2	x	12	1	1	1
25,000-50,000	65	21	32.3	5	x	9	3	1	3
15,000-25,000	48	10	20.8	1	x	4	4	x	1
10,000-15,000	38	9	23.7	x	1	5	x	x	3
5,000-10,000	60	17	28.3	3	x	9	1	x	4
2,500-5,000	55	10	18.2	1	1	4	1	x	3
Under 2,500	35	7	20.0	x	2	3	x	x	2
Totals	410	117	28.8	20	4	54	17	3	19

With respect to back siphonage conditions there is little hope for rapid and complete elimination of defective plumbing fixtures, although much can be done over a period of years. At the moment there is need to do all that can be done to improve the water distributing systems so that back siphonage will not occur and to provide for counteracting the effects of localized contamination should it occur. The more extensive use of chlorine-ammonia treatment in this connection is pointed

slight chlorine residual can be maintained throughout the distributing system. Usually such residuals have been of a low order, ranging from a trace up to 0.1 p.p.m. In a few cases where ammonia is employed residuals of a much higher order may be carried to the ends of the system without creating objectionable tastes. Some communities which have undertaken so-called "break-point" chlorination and utilizing ammonia are carrying residuals of 2 to 3 p.p.m. to the ends of their

systems with much improvement in the palatable qualities of the water. The data obtained from the replies furnish some indication that low residuals even though present throughout the distribution system do not afford much factor of safety against localized contamination, but that real protection is afforded when high chlorine residuals are carried throughout the system. No place, using chloramine treatment and carrying residuals throughout the system of 0.2 p.p.m. or more, reported any case of localized contamination.

Current research now in progress in the studies and applications of so-called "break-point" chlorination should be followed closely. If actual practice continues to bear out the promising results already obtained, we may possibly have a reliable method whereby high chloramine residuals may be carried throughout the system without producing objectionable tastes, and which will assure the quick killing of bacteria introduced into the distributing system as a result of cross-connections or back siphonage conditions.

*Pressure Reductions over Systems*—Conditions conducive to general back siphonage are created when pressures are reduced to zero or below over large portions of the distributing systems. The extent to which these conditions

have occurred is indicated by the data of Table 9. Floods, main pipe line failures, power failures, etc., are primarily responsible. That such conditions have been reported by one-third of the municipalities studied is a fact worthy of serious thought and consideration. It is significant that most of the communities reporting such instances also reported instances of localized contamination.

The necessity of water shut-offs to make repairs or new connections appears to vary considerably. In many communities where tapping machines are employed, water service is rarely disrupted. In about one-third of the communities reporting, water shut-offs are extremely infrequent.

*Recording Pressure Gauges*—These are needed to give water superintendents a knowledge of the details of pressure variations and the particular sections where back siphonage conditions are likely to become established. One hundred and twenty-one of the municipalities studied have no recording gauges on the system; 7 of these are places with populations over 100,000, 6 between 50,000 and 100,000, and 27 between 15,000 and 50,000.

*Special Precautions during Fires*—Most systems are not specifically designed to prevent the development of

TABLE 9  
*Occurrences of Zero Pressures in Distribution Systems—1935 to 1940*

Population Group	Total Number of Places Reporting	Municipalities Reporting Instances When Pressures Have Been Reduced to Zero Over Large Portions of Distributing Systems	
		Total Number	Per cent
Over 100,000	62	18	29.0
50,000-100,000	47	15	31.9
25,000- 50,000	65	18	27.7
15,000- 25,000	48	11	22.9
10,000- 15,000	38	7	18.4
5,000- 10,000	60	26	43.3
2,500- 5,000	55	20	36.4
Under 2,500	35	18	51.4
Totals	410	133	32.4



negative heads when large fire pumpers are connected with small mains or dead end laterals. One hundred and eighty-six of the communities reported that special precautions such as checks for pressure reductions or increase in chlorine dosage were taken during fires. The data reflect a need for improvements which would enable supplies to operate normally during fires.

*Duplicate Equipment* — Duplicate sources of power, duplicate pumps, chlorinators, etc., are important safeguards in reducing interruptions in the treatment or delivery of water to a minimum. The lack of duplicate equipment seems to be more of a problem in the small municipalities—82 per cent of the places studied report that duplicate equipment is provided, which is gratifying.

*Instruction of Employees as to Emergencies*—From the replies there is evidence that much effort has been made in past years to have water plant employees trained and instructed in regard to the handling of emergency situations. Eighty-seven per cent of the communities replying indicated that employees were instructed in regard to such problems.

*Cross-connections*—To a considerable extent the emphasis given in past years to the dangers of uncontrolled cross-connections seems to have been

productive of much good. The replies reflect a wholesome respect for the dangers of cross-connections and a rather concerted opinion that such connections should be absolutely prohibited.

Many municipalities do prohibit such connections and make frequent investigations to detect them. Many under state laws or regulations prohibit all new cross-connections but permit old ones to remain under certain conditions. In only a few instances were unapproved or unsupervised cross-connections reported. Apparent from the replies is the problem in several communities of promiscuous connections with individual private wells and cisterns. Of the municipalities reporting, cross-connections are prohibited in 220 and permitted under certain conditions in 148. The cross-connection problem appears to be confined mainly but not entirely to places of more than 5,000 population.

#### IV. VARIATIONS IN WATER CONTROL PRACTICES

The data obtained show wide extremes and variations in present practices, and some examples are given to illustrate these variations. Only one such example will be indicated in these abstracts. ("I," "J," and "K" refer to certain unnamed municipalities.)

	"I"	"J"	"K"
Population	Under 2,500	Over 100,000	Over 300,000
Water Supply	Surface	Surface	Surface
Treatment	Filtration-chlorine	Chlorine	Chlorine-ammonia
Local Plant Laboratory	Yes	No	No
Treated Water Examined	Daily	None	Monthly
Open Reservoirs on System	Yes	Yes	Yes
Treatment in Open Reservoirs	Chlorine	None	None
Samples from Open Reservoirs	Daily	None	None
Annual Samples from Distributing System	156	300	None
Residual Cl <sub>2</sub> Throughout System	Trace	No	Tests not made
Instances of Localized Contamination	No	Yes	Yes
Instances of Zero Pressures	No	Yes	No

## SUMMARY AND CONCLUSIONS

In this study, special consideration has been given to measures taken to produce and assure the delivery of safe water into distributing systems; to prevent or counteract the effects of secondary contamination; to assure the delivery of safe water from open reservoirs; and to preserve the safe quality of water as it flows through the distributing system to the consumers. *Important as these matters are in normal times, they assume a magnified importance in a period when the world suffers from the ravages of war and when on this continent the possibility of sabotage of water works systems must be considered seriously.*

Attention has been drawn to certain weakness in present-day control practices, and the committee desires to emphasize the existing deficiencies in the application of certain well understood and recognized principles.

The facts as reported fairly well speak for themselves. Municipalities which provide for controls of a lower order than practised by the majority of communities in the same population group, as a matter of general principle, should give serious consideration to improvements. The wide range in the control practices of communities in the same population group is a strong indication of the needs for improvement.

As a result of its studies the committee presents the following conclusions:

1. Many communities in all population groups maintain grossly inadequate records of the quality of water as delivered into distributing systems. The deficiencies in this respect are particularly common for municipalities where disinfection processes only are employed.

2. There is an urgent need in many places for the development of local water plant laboratories equipped to make bacteriological analyses, or other provisions for essential laboratory service.

3. There is evidence of a striking need for treatment of water in open reservoirs, par-

ticularly in the larger municipalities. *In view of war conditions, it is timely that consideration be given to positive measures to protect against deliberate attempts to contaminate water in open reservoirs.*

4. The large majority of communities of all population groups maintain a wholly inadequate program of sampling from distributing systems. There is urgent need for great extension of sampling programs over distributing systems.

5. Many communities of all population groups should give serious consideration of chlorine-ammonia treatment as a means of providing greater protection to the water in distributing systems. In this connection it should be borne in mind that so-called "break-point" chlorination gives some promise of a reliable method whereby distributing systems may be furnished considerable protection against the possibility of secondary contamination.

6. Data obtained indicating instances of localized contamination in about one-third of the municipalities reporting, and attributed to such causes as back siphonage, cross-connections, and repairs to systems, reflect an urgent need for establishing much more rigid supervision over distributing systems than has ever heretofore prevailed. Many opportunities exist for the reduction of these causes.

7. Data obtained indicating instances of zero pressures over large portions of the distributing system in one-third of the municipalities reporting, due to floods, droughts, power and main pipe line failures, reflect an urgent need for the physical improvement of water supplies. Many communities need to be shaken out of their attitudes of complacency toward needed water supply improvements.

8. Shut-offs along small sections of the distributing system are infrequent in about one-third of the municipalities reporting. Generally speaking, it is in these communities that instances of localized contamination or widespread pressure reductions have not occurred.

9. Additional recording pressure gauges are needed by many municipalities of all population groups.

10. Many communities are in need of additional improvements in their water systems to provide for the delivery of an adequate quantity of safe water during fires.

11. The situation with respect to maintenance of duplicate equipment to assure continuity in the delivery or treatment of water appears encouraging. Most of the municipalities reporting indicated that duplicate equipment was provided.

12. Most municipalities reporting indicated that their water department employees have

been instructed in regard to the handling of emergencies of a major nature.

13. The cross-connection problem has received much consideration in recent years. The municipalities reporting indicated a rather concerted opinion that cross-connections should be absolutely prohibited. Cross-connections are prohibited in about two-thirds of the communities reporting although in many cases old cross-connections are permitted under certain conditions.

14. It may be assumed that replies to the questionnaire came principally from the more alert and coöperative superintendents. It seems fair to assume therefore that if data were available from all communities through-

out the country the deficiencies pointed to herein might be considerably greater than indicated.

ANSELMO F. DAPPERT, *Chairman*

H. J. DARCEY

ARTHUR E. GORMAN

R. F. GOUDEY

GRAHAM M. HATCH

L. L. HEDGEPEETH

HAROLD S. HUTTON

C. W. KLASSEN

ARTHUR D. WESTON

# Standards of Water Purity<sup>\*†</sup>

## A Progress Report

### *Engineering Section*

RECENT years have witnessed an ever increasing public interest in and demand for the reduction and prevention of waterways pollution. While national water pollution legislation of the broadest type has as yet failed of enactment, because of differences of opinion of those sponsoring such legislation, there is, nevertheless, an apparent desire on the part of the Congress to enact such legislation.

Coincidental to a growing demand for better control of water pollution, there is developing a parallel need for standards of purity. The 1935 report of this committee reviewed the status of the problem then existing and recommended that an experienced public health agency undertake a thorough study of limiting standards of purity for various water uses. During the past two years the U. S. Public Health Service has been conducting an extensive survey of pollution of the Ohio River basin and the data collected to date, together with data obtained by the U. S. Public Health Service during its investigations in past years, are now being studied, and a concise, clear background statement

covering stream quality for various uses is planned.

Persons concerned with the administration of laws for the purpose of reducing or preventing water pollution have long sought a standard or set of standards which may be used to express the amount of treatment which shall be required of any given sewage or waste. Three types of standards have been considered by those interested in the problem. One method provides for the establishment of standards for a given body of water receiving sewage and wastes, another for standards applicable not to the receiving body of water but the sewage, effluents or wastes discharged into the water in question, and the third provides for a combination of the two listed above.

Standards of purity or sanitary classifications of streams must be practical of enforcement. It is possible that some variation in standards for different sections of the country must be recognized. What may be feasible in the Pacific Northwest, for example, may not be possible of attainment at the present in the highly industrialized and heavily populated northeastern United States. The complexity of the problem, and the difficulty encountered in attempting to reach its solution, have long been appreciated in the United States and other countries.

---

\* Brief of Report of the Committee on Waterways Pollution.

† A major portion of the material contained in this report is taken from a thesis by Carl E. Green submitted to the committee on graduate study of Stanford University. June, 1940, and entitled "Water Pollution and Its Control in Oregon."

Streams and water courses may be used for a multiplicity of purposes. They also have a multiplicity of values, some of which may be measured on a monetary basis and others of which are intangible, but, nevertheless, important assets. How, for example, can one evaluate the esthetic attraction of clean water as compared to polluted water? Are there not instances in which a watercourse may be of more value to a drainage basin or state as a means of carrying away or disposing of wastes, than for the propagation of fish life?

#### HISTORY

The British were probably the first to give serious consideration to this problem.<sup>1</sup> This is evidenced by the reports of the British Royal Commissions on Sewage Disposal as early as 1865.

Massachusetts,<sup>2</sup> in 1872, was the first state to study the problem in the United States. In 1893, the Congress authorized the U. S. Public Health Service to coöperate with state and municipal boards of health on these matters; in 1912, it also authorized studies and investigations of navigable streams and lakes.

Investigations in the Mississippi River and Great Lakes basins,<sup>1</sup> by the U. S. Public Health Service, led to the accumulation of data which enabled the government to state that the limiting amount of sewage pollution of a natural surface water supply which after suitable treatment is to be used for drinking purposes, should not exceed 5,000 *B. coli* per 100 c.c. in locations at which average, efficient, modern water filtration plants using final chlorination are employed to treat the water. Other studies by the Public Health Service have also shown that the maximum allowable limit of *B. coli* in natural waters which after simple chlorination are used for drinking purposes, or are used for bathing and recreational areas, or are used for

the growing of shellfish, should not exceed 50 per 100 cc.

The British Royal Commission on Sewage Disposal<sup>1</sup> has formulated two sets of standards. One deals with specifications for various industrial or trade wastes, while the other deals with sewage effluents. The latter standard requires effluents to have suspended matter not to exceed 30 p.p.m. and a 5 day biochemical oxygen demand (B.O.D.) at 65° F. not to exceed 20 p.p.m.

Streeter<sup>3</sup> of the U. S. Public Health Service has recently formulated a tentative sanitary classification of stream waters for use in connection with pollution abatement programs. The classifications outlined in Streeter's unpublished standards provide for classes A, B, and C, plus a special class AA for reserved recreational areas.

If any standard or standards are to be established in any state or drainage basin, they should be predicated upon reliable and sufficient data. The basic fault of some standards which have been adopted in the past and which may be adopted or advocated in the future, lies in the fact that a sufficiently comprehensive background of properly coordinated, scientific data is not available to sustain such standards in the courts.<sup>4</sup> The U. S. Public Health Service has obtained sufficient data for the establishment of its few recommended standards. Streeter's recent classifications are based upon the extensive observations and data obtained in the Ohio River survey. The British Royal Commissions also have a wealth of basic data with which to support their standards. In the Ohio River basin<sup>5</sup> a proposed standard of removal of not less than 55 per cent of suspended solids by municipal sewage treatment plants in the basin had to be lowered to not less than 45 per cent because it was found that some of the existing plants now in operation could not meet such

a standard, based upon yearly average results.

Hering concluded, in 1887, that if nuisances were to be prevented, a minimum stream flow dilution of 3.3 cu. ft. per second was required for each 1,000 persons discharging raw sewage into the Chicago Drainage Canal. Stearns, of the Massachusetts State Board of Health, advocated, in 1890, minimum dilutions of from 2.5 to 7.0 c.f.s. per 1,000 population.

The application of standards based wholly upon dilution factors must be used with caution. The presence of industrial wastes in a city's sewage may so change its strength that population statistics may be entirely erroneous for use as a basis for calculating needed dilutions to prevent nuisances.

In 1935 Streeter<sup>6</sup> prepared a memorandum for the Water Resources Section of the National Resources Board on the subject of "Standards of Water Quality and Cleanliness." In this study, Streeter reviewed the practices in 25 states and found that, with one exception, all standards of water purity of any kind in use in the states were based upon opinions and rather loosely correlated experience, rather than upon adequate basic data.

#### PUBLIC WATER SUPPLY STANDARDS

Aside from the U. S. Public Health Service standard of quality of drinking waters used by common carriers in interstate traffic, there are no other generally accepted and widely used standards. This standard for drinking waters provides that the *B. coli* index shall not exceed an average of 1 per 100 cc., and that no more than 5 per cent of the samples collected shall have an index of 6 or more per 100 cc. For waters to be purified for drinking purposes, Streeter has formulated the following standards:

1. Impounded underground waters treated by chlorination only:

- B. coli* index shall not exceed 50 per 100 cc.
2. Surface waters being treated by adequate filtration and chlorination processes:  
*B. coli* index shall not exceed 5,000 per 100 cc.

#### BATHING, SWIMMING, RECREATIONAL, AND SHELLFISH AREAS

Considerable variation in recommendations for quality of water for outdoor bathing waters is found, but most authorities seem to favor a limiting *B. coli* index of 50 per 100 cc. This same value finds favor as a limiting value for approved shellfish growing areas.

All bacterial standards of water purity are based upon the *B. coli* index per cc. or per 100 cc.\* The use of the coliform organisms as a measure of sanitary quality of water, is predicated upon the fact that they are normal inhabitants of the intestinal tract of warm-blooded animals; they are non-pathogenic; they are excreted in large numbers and are usually more resistant to unfavorable environment than most disease organisms. In most all instances, pathogenic organisms are not apt to be found in water in the absence of the coliform group, but an exception must be noted with reference to *E. histolytica* which is the cause of amebic dysentery.

Research by Beard,<sup>7</sup> S.,<sup>8</sup> Green,<sup>8</sup> Meadowcroft,<sup>9</sup> and others, has shown that the organisms causing typhoid fever (*E. typhi*) tend to die off fairly rapidly in water, sea water, sewage and soil, but there are many factors influencing their survival and those that survive their first exposure to unfavorable environment may not die for many months.

While other indices of pollution may

---

\* *B. coli* is known more correctly as *Escherichia coli* and the term "coliform organisms" is frequently used to designate this group of bacteria. Their numbers may be expressed as M.P.N. (most probable number) per cc. or 100 cc. also.

be used for determining the sanitary quality of water, such as nitrogen compounds, chlorides, oxygen consuming organic matter, etc., probably the one most reliable index of pollution is the *B. coli* or coliform organism index. The salts of heavy metals may make a water supply dangerous also, but their presence in toxic amounts is relatively infrequent, hence laboratory determinations for their presence are seldom made. A more detailed discussion of chemical constituents of water will be found in the discussion of fish and aquatic life, which follows in a later section.

#### INDUSTRIAL WATER SUPPLIES

In any attempt to prepare standards for industrial water supplies, one must immediately recognize that the quality of water needed by different industries and in the component parts of single industries is so varied that any one criterion would be extremely difficult to formulate. Aside from chemical constituents, such as those which form scales in boilers, it may be safely stated, however, that in most industries it is possible to produce a satisfactory water supply with a raw water source from which it is possible to produce a safe and potable drinking water supply. It follows, therefore, that any standards sufficient for the protection of public water supplies should also be adequate for the protection of industrial water supplies.

#### FISH AND AQUATIC LIFE

Any attempt to establish standards of purity for sewage and industrial treatment plant effluents, as well as for receiving bodies of water, must inevitably include a consideration of fish and aquatic life. The establishment of such a standard is in many ways more complex than first might seem the case. In 1929, there was considerable support extant for the adoption of a minimum dissolved oxygen (D.O.) standard of

30 per cent saturation, because it had been shown that this value represented the lowest point of D.O. at which most game fish could survive. True it is that other more hardy forms can be found in waters having a lower D.O. content, but game fish, such as trout, were found able to swim in the presence of about 3 p.p.m. D.O. or about 30 per cent saturation.

In reports of the U. S. Bureau of Fisheries of 1935 and 1937, Ellis<sup>10, 11</sup> has shown by exhaustive studies that while fish may survive under certain oxygen concentrations, it does not necessarily follow that such concentrations are desirable minima. He points out the metabolic adjustments in fishes which are necessary for them to survive under unfavorable, but not lethal conditions.

Extensive studies on the Mississippi River have shown that abundant fish and aquatic life is not usually found in areas having a D.O. content below 5 p.p.m. As a result of the studies conducted under Ellis's direction he feels that the desirable minimum of D.O. should be 5 p.p.m. at all times.

Stream pollutants may affect fish and aquatic life detrimentally in many ways other than that of reducing dissolved oxygen. Some wastes may cause specific physiological and toxic effects. Indirect effects may be brought about by change in pH, or by change in the natural buffers (usually carbonates), in addition to suffocation which is caused by low oxygen content.

*It is particularly important that limiting standards apply during the most severe conditions, i.e., low water, high temperature, and maximum pollution. If this is not done, compliance during the remainder of the year may be of no avail.*

Experience of the U. S. Bureau of Fisheries has shown that water conditions affecting fish life can best be ascertained by the following determinations:

1. Dissolved oxygen
2. pH
3. Ionizable salts
4. Carbon dioxide, fixed and free
5. Total ammonia
6. Suspensoids

It is important that these determinations be made during various seasons of the year, especially the critical periods, and during both day and night. To make all of the preceding determinations during water pollution surveys would greatly increase the time, personnel, equipment, and expense involved. For practical reasons, it is usually necessary to limit the studies to the fewest, most important determinations, and the other more extensive examinations may be used for special purposes.

#### *Dissolved Oxygen*

In most instances, the dissolved oxygen determination is of most importance. It is well to note that the amount of D.O. which will barely support fish life varies with combinations of environmental factors at the time and with the size and species of fish. Temperature, pH, and carbon dioxide content are especially important in this connection.

It has been argued by some authorities that the B.O.D. of a body of water should be determined as well as the D.O. In fact, Hubbs<sup>12</sup> advocates a "reserve oxygen" balance of about 3 p.p.m., which represents the D.O. content of a water, less the B.O.D. of the water. "Reserve oxygen" is not a reliable standard of purity for two obvious reasons, namely: (1) It is possible to have a negative "reserve oxygen" balance in a water and still have abundant fish and aquatic life. (2) There is no logical scientific reason for subtracting from the D.O. content of a given body of water at a particular moment the amount of oxygen required for aerobic biological stabilization of the water at 20° C. over a period of 5 days. To do so is to ignore the fact

that during the 5 day period the water usually has an opportunity for reaeration, for dilution, for the addition of other wastes, for plankton activity to take place, and possibly to flow many miles downstream. It would seem that a specific minimum D.O. content is basically more correct and reliable than a "reserve oxygen" balance. The determination of B.O.D. of a waterway receiving sewage and industrial wastes effluents furnishes valuable information to the sanitary engineer called upon to determine the cleanliness of such a waterway. The B.O.D. of the receiving stream is often determined "above and below" the point of discharge of the effluent; by comparison and assisted by the determinations of D.O., additional information is afforded of the likelihood of critical stream conditions.

Bodies of water which are covered with ice during the winter present special problems, because the usual benefits of reaeration are lost with an ice cover, and sludge deposits may seriously deplete available oxygen in addition to that required by the wastes being discharged at that season of the year. This factor is of great importance in the Great Lakes area for example, and of little consequence in the southern states.

#### *Hydrogen ion Concentration*

The pH of most natural waters without the presence of polluting substances usually varies between 6.7 and 8.6, but exceptions are found in some parts of the country.

Hydrogen ion determinations are helpful in detecting certain forms of pollution, such as acid or alkali wastes. These tests are also helpful in measuring the activity of chlorophyll bearing plankton, because during daylight, these plants split bicarbonates to obtain the carbon dioxide necessary for their life processes, and thus convert bicarbonates to normal carbonates, and, in turn, re-



lease oxygen. Thus, heavy growths of algae may cause supersaturation with oxygen during the daytime and an increase in pH values, whereas decomposition of organic matter and plant respiration during night time may decrease the oxygen content, increase the carbon dioxide content, redissolve some of the normal carbonates, and lower the pH value.

Most waters having pH values outside of the limits normal to the locality should be viewed with suspicion—some industrial waste may be responsible for the variation from normal. Acid wastes from metal works, milk wastes containing whey, spent liquors from tanneries, etc., may often be detected by pH tests.

#### *Ionizable Salts—Specific Conductance*

The capacity of a given water solution or electrolyte to carry an electrical current varies with the ionizable salts it contains. Use is made of this fact in the specific conductance test. The greater the conductance of a natural water, the greater the amount of ionizable substances present.

Unpolluted natural waters usually contain metallic ions of calcium, magnesium, sodium, potassium, iron and manganese, and traces of other metallic elements. These are usually present as carbonates, bicarbonates, chlorides, phosphates, and sulfates. Some nitrates and nitrites are apt to be found, also; their presence indicates the existence of organic matter.

Most aquatic animals and plants can stand a considerable variation in the ionizable salts concentration, but Ellis<sup>11</sup> has found that streams supporting good, mixed faunae and flora generally had specific conductance \* values of between 150 and 500 mho  $\times 10^{-6}$  at 25° C.

This test offers a quick method of

detecting the presence of metallic, salt and alkali polluting materials.

#### *Carbon Dioxide*

Except in so far as carbonates may affect the specific conductance of a water, the fixed carbon dioxide of a water is not a determining factor in the classification of waters suitable for fresh water fish. But since the fixed carbon dioxide of a water is the principal buffer acted upon by both acid and alkali wastes, the maximum non-toxic dilution of some industrial effluents may be determined by the amount of fixed CO<sub>2</sub> present.

Good fish faunae usually are found in regions in which the free CO<sub>2</sub> is less than 2 cc. per liter, or 3.6 p.p.m. at 20° C. Values in excess of 3 cc. of CO<sub>2</sub> per liter generally indicates the presence of organic pollution.

#### *Ammonia*

The toxicity of ammonia has been shown to be greatly influenced by pH; the more alkaline the water, the more toxic is NH<sub>3</sub>. Ellis and Chipman<sup>13</sup> have shown that the toxicity of ammonium compounds increases 200 per cent with an increase in pH from 7.4 to 8.0.

Since very small amounts of ammonia are found in unpolluted waters, amounts of 2 or 3 p.p.m. usually indicate definite organic pollution.

#### *Suspensoids*

Considerable difference in opinion exists regarding the relative importance of suspended material as related to fish and aquatic life. Ward<sup>14</sup> in a study for the Oregon State Department of Geology and Mineral Industries, made in 1935, concluded that suspended material in the Rogue River of Oregon had little or no effect upon the fish life of the stream.

Ellis<sup>10</sup> states that suspensoids are important because they blanket out bot-

\* Specific conductance of a solution in mho is the reciprocal of the value of its resistance in ohms

tom fauna, greatly reduce available food, cover nests and spawning grounds, and by their mechanical and abrasive action clog or injure the gills and respiratory structures of fish and mollusks. Silt may also prevent the passage of light through water, thereby limiting the activity of chlorophyll bearing plants and reducing the fish food supply. Suspensoids may also carry pollutants to the bottom, there to form sludge deposits, with attendant oxygen depletion and injury to spawning beds.

#### GENERAL DISCUSSION—WATERWAYS STANDARDS

No one standard can be intelligently applied for all purposes to each state, drainage basin, sub-basin, or locality. Necessarily, water uses vary in character and in their value, and all factors should be considered in arriving at a decision regarding the extent of treatment required in any given case. It is enlightening to review the practices in those states which have been conducting stream pollution reduction programs in a successful manner.

In Minnesota<sup>15</sup> each problem of sewage or waste treatment is considered separately. After a study of local conditions and needs, the State Department of Health recommends specific treatment facilities for each particular case. Thus, the extent of treatment in each instance is left to the judgment of experienced sanitary engineers within the Department of Health.

Wisconsin has been recognized as one of the states most successful in controlling water pollution. In 1927, Wisconsin<sup>16</sup> adopted a minimum D.O. standard of 2.0 p.p.m., to be used in water pollution control work. It was regarded as the lowest permissible D.O. value under conditions of low stream flow and high water temperature. Later observations showed prolonged exposure of game fish to such conditions resulted either in death of fish, or migration to

other areas, if such areas could be reached. Wisconsin now<sup>17</sup> endeavors to maintain nearer to 4 p.p.m. D.O. under low flow and high temperature conditions. For the discharge of "white water" wastes from pulp and paper mills, Wisconsin has adopted a standard of fiber loss not exceeding 1 per cent of production, and a volume not exceeding 20,000 gallons per ton of products. Warrick<sup>17</sup> also points out the importance of settleable solids in effluents, in so far as fish life is concerned. An accumulation of solids from the effluents of some industries, such as those from de-inked paper manufacturing plants, may destroy spawning beds.

Ohio is another state in which great progress has been made during the past decade. Waring<sup>5</sup> reports that Ohio has not established definite stream standards for the entire state, and, further, that it is impossible to fix a standard for all situations. Instead, the State Department of Health relies upon its sanitary engineers to study and set forth requirements for each. This practice is identical with that of Minnesota.

In Illinois also, Klassen<sup>18</sup> reports agreement with the principle followed in Minnesota and Ohio. Particularly, in dealing with industrial wastes, Klassen believes it is imperative to consider each case separately on its own merits. Except for the Ohio River Basin Sanitation Compact Agreement (which is discussed later), the state of Illinois has established no stream or water standards.

In Maryland<sup>19</sup> no standards have been established, but instead each particular case is considered as a separate problem in which due consideration is given both local conditions and downstream uses.

The Michigan Stream Control Commission published,<sup>20</sup> in 1933, a classification of various waters on a basis of *B. coli* index as follows:

*B. coli* Index per 100 cc.

Type of Water

0	Water free from pollution
0-1	U.S.P.H.S. drinking water standard
10-100	Good water, normal for inland and Great Lakes, free of sewage pollution
100-500	Normal for inland streams, free of detrimental sewage pollution; attributed to land wash
1,000	Suspicious—indicates mild pollution in natural waters, but dangerous in proximity to fresh sewage pollution
10,000	Definite evidence of fresh sewage pollution—menace to health
100,000	Heavy sewage pollution—definitely bad
1,000,000 or more	Normal sewage

Lundie <sup>21</sup> has classified streams on a basis of their biochemical oxygen demand, as follows:

<i>B.O.D. in p.p.m.</i> (5 days)	<i>Classification</i>
Less than 1.0	Very clean
1.0- 2.0	Clean
2.0- 2.7	Fairly clean
2.7- 3.1	Moderately clean
3.1- 5.0	Doubtful
5.0-10.0	Bad

The Indiana Stream Pollution law of 1935 was interpreted unofficially by the state attorney general to require the establishment of standards of purity for streams, and, further, that such standards should define clean waters.<sup>22</sup>

Poole reports<sup>22</sup> that the Indiana standards have been helpful in dealing with lay people on matters of stream pollution. The Indiana standards do not mention the quality of effluents which may be discharged into a water course of the state; consequently, all interpretation of compliance or non-compliance must rest upon actual stream conditions. The difficulty, particularly in any court cases which might arise, of establishing a given city or industry discharging sewage or waste into a body of water, as responsible for the water not meeting the adopted standards, is readily apparent. It would seem that the quality of effluents should also be

included in any set of standards, otherwise extreme difficulty might be experienced in determining compliance and fixing responsibility for pollution.

The Pennsylvania Sanitary Water Board was probably the first state agency in the United States to establish a classification of waters.<sup>23</sup> In these classifications, official recognition was given to the use of some streams for what might be called "open sewers."

The Pennsylvania classifications are:

- "Class A: Relatively clean and pure streams, unpolluted or uncontaminated from any artificial source, suitable for domestic water supply after chlorination. Artificial pollution of such streams is prohibited and a high degree of treatment of any sewage or industrial waste is required before its discharge into them.
- "Class B: Streams in which pollution shall be controlled, the degree of control to be dependent upon the general public interests and economics in each particular case.
- "Class C: Streams so polluted that their control or recovery is not economically feasible or advisable beyond the prevention of nuisance or menace to health."

### *Interstate Compacts*

Interstate compacts and agreements date only from 1935, when the Congress of the United States approved a compact between the states of New Jersey and New York for the creation of an Interstate Sanitation District and the

establishment of an Interstate Sanitation Commission. In the original contract, Connecticut was provided for, but on January 24, 1936, when the New York and New Jersey commissioners took office, Connecticut had not yet ratified the agreement. This compact has as its two major purposes the reduction of existing pollution in coastal waters in adjacent portions of the signatory states and the prevention or control of future pollution in the area.

The Interstate Sanitation Commission has established classifications or standards of purity for the New York City harbor area, as follows: <sup>24</sup>

- " (1) Class A, in which the designated water areas are expected to be used primarily for recreational purposes, shellfish culture or the development of fish life.
- " (2) Class B, in which the designated water areas are not expected to be used primarily for recreational purposes, shellfish culture or the development of fish life."

The classifications state further that all sewage discharged or permitted to flow into waters of these two classes shall first have been so treated as to meet specific standards for removal of suspended solids, reduction of *B. coli*, and the maintenance of minimum dissolved oxygen concentrations in the receiving body of water.

The Ohio River Valley Compact Commission, which included representatives of the states of Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Tennessee, and West Virginia, was formed for the purpose of establishing an agreement between the above states for the abatement and control of water pollution in the Ohio River drainage basin. This commission was preceded by an informal agreement among the chief engineers of the departments of health of the various states in the basin. Before this proposed compact may become effective, it must be adopted by the various state legislatures and secure

the approval of the Congress. To date the "Ohio River Valley Water Sanitation Compact" has been adopted by the legislatures of the states of Indiana, West Virginia, Ohio, New York, Illinois, and Kentucky, these states being arranged in the order chronologically of the adoption of the compact by the several legislatures. The compact has also been approved by Congress (Public Resolution No. 739, 76th Congress, approved July 11, 1940). Upon the further adoption by the legislature of Pennsylvania, the compact may become operative.

The Compact Commission has established <sup>25</sup> under Article VI, a minimum standard for the treatment of sewage in the basin which recognizes no single standard for the treatment of all sewage and industrial wastes. A minimum removal of 45 per cent of total suspended solids from sewage is provided, however. In these standards recognition is given to the factors of size, flow, location, character, self-purification and usage of the various waters within the district.

A compact, similar to that of the Ohio River valley, is proposed for the Potomac River basin.<sup>26</sup> The interested governments are Maryland, Pennsylvania, Virginia, West Virginia, the District of Columbia, and the federal government.

The Interstate Commission on the Delaware River Basin<sup>27</sup> was organized in 1936 by a joint legislative commission of the interested states of New Jersey, New York, and Pennsylvania. After having studied the problem of water pollution in the basin, it has divided the area into four zones or classifications, in which minimum requirements for sewage and waste treatment are established as well as quality of water into which sewage and wastes are discharged. The classifications adopted by the Commission include standards relating to appearance, turbidity, solids, B.O.D., D.O. reduction in the receiving stream, coli-aerogenes

organisms, toxic substances, and waste and odor producing substances.

It is noted that in this instance, recognition is given of the impossibility of establishing one standard of purity for waterways in the entire drainage basin. The four zones of purity were established after a careful consideration of the many factors involved. The classifications adopted by the Interstate Commission of the Delaware River Basin are more detailed than any others extant in the United States at this time. In so far as fish life is concerned, they depend primarily upon maintaining sufficient D.O. to protect fish life without specifying limiting amounts of other substances which might also affect fish life.

The Oregon State Sanitary Authority adopted, on March 1, 1940, a classification of the waters of the state for the purposes of regulating the discharge of sewage or sewage effluents into the waters of the state. These regulations classify waters into three divisions—A, B, and C. Detailed specifications are given for the treatment of sewage to be discharged into both class A and class B waters. Expressed in general terms, these regulations call for complete treatment of sewage before discharge into class A waters, and primary treatment prior to discharge into class B waters. The discharge of raw sewage into class C waters is permitted on a temporary basis. The Oregon regulations include specifications for appearance, B.O.D., D.O. of receiving streams, suspended solids, and coliform organisms.

#### SUMMARY AND DISCUSSION OF STANDARDS OF WATER PURITY AND THE SANITARY CLASSIFICATION OF WATERS

The policies of state, multi-state compact organizations, and the U. S. Public Health Service all serve to emphasize the extreme care with which any regulatory body should approach the problem of establishment of standards

of water purity for streams, lakes, coastal waters, and for sewage and industrial waste treatment plant effluents. The importance and necessity of obtaining basic data regarding the characteristics and extent of pollution should be obvious. No one standard of purity will apply to an entire state or drainage basin.

The regulation of industrial waste is more complex and more difficult of solution than the regulation of municipal sewage. Industrial wastes may sometimes affect the public health. Examples of such influence are the presence of taste and odor producing substances such as phenolic constituents occurring in wastes from by-product plants, capable in small amounts of rendering a public water supply entirely unusable for drinking purposes and necessitating the treatment of such wastes to eliminate the phenolic constituents. The public health may also be affected by industrial wastes in some instances when the wastes are combined with sanitary sewage to increase materially the population equivalent of said sewage, or when they may contain toxic substances. Industrial wastes may seriously deplete the dissolved oxygen content of water and thereby affect fish and aquatic life. Such wastes may also cause discoloration, contain floating substances, cause odors, create nuisances, blanket fish spawning beds, interfere with the propagation of shellfish, etc. They are, therefore, extremely important in any water pollution control program. In some areas they may be the single, serious cause of oxygen depletion in a body of water.

There are methods known for the treatment of many industrial wastes. On the other hand, there are many other industrial wastes for which no known economical methods of treatment are now available. Industrial waste treatment and by-products recovery processes which are economically feasible

ible in one section of the country may not be in others. For example, processes in use for the treatment of sulfite waste liquor from certain pulp and paper mills in the Great Lakes area are not economic at this time in the Pacific Northwest. Such processes used for the recovery of fuel from such wastes are unattractive in Oregon and Washington because of the abundance of cheap "hog fuel" \* and cheap hydroelectric power.

In spite of the importance of industrial wastes in the national water pollution control program, it would be extremely difficult to establish a standard or set of standards for the treatment of wastes included in this category unless the standards were written on a basis of the maintenance of certain specific conditions in the receiving body of water. There is no substitute—standards, classifications, or otherwise—which may replace the need for intelligent investigation and careful consideration which should be given by sanitary engineers to every industrial waste disposal problem confronting a state, drainage basin, or federal water pollution control agency.

While it is granted that standards of purity or sanitary classifications of streams and sewage effluents are helpful to persons and agencies charged with the responsibilities of reducing and preventing the pollution of waterways, standards should not be used as an excuse for the lack of application of known principles of sanitary science.

\* "Hog fuel"—chipped waste from lumber mill operations.

#### BIBLIOGRAPHY AND REFERENCES

1. Streeter, H. W. *Tendencies in Standards of River and Lake Cleanliness. Pub. Health Rep.*, 49, 34:981-92 (Aug. 24), 1934.
2. *Annual Reports*, Massachusetts State Board of Health Including Reports on Water Supplies & Water Supply & Sewerage, 1887 to 1897.
3. Streeter, H. W. Unpublished Paper Presented before American Chemical Society, Mar., 1940.
4. Progress Report, Committee on Waterways Pollution, American Public Health Association *Year Book 1935-1936*, p. 233.
5. Waring, F. H., Chief Engineer, Ohio Dept. of Health. Communication to the writer, Nov. 17, 1939.
6. Streeter, H. W. Communication to the writer, Nov. 14, 1939.
7. Beard, Paul J. The Survival of Typhoid in Nature. *J. Am. Water Works A.*, 30, 1:24-130, (Jan.), 1938.
8. Green, Carl E., and Beard, Paul J. Survival of *E. Typhi* in Sewage Treatment Plant Processes. *A.J.P.H.*, 28, 6:762-770 (June), 1938.
9. Beard, Paul J., and Meadowcroft, Neil F. Survival and Rate of Death of Intestinal Bacteria in Sea Water. *A.J.P.H.*, 25, 9:1023-36 (Sept.), 1935.
10. Ellis, M. M. Water Purity Standards for Fresh Water Fishes. *Special Report*, U. S. Bureau of Fisheries, 1935.
11. Ellis, M. M. Detection and Measurement of Stream Pollution. *Bull.* 22, U. S. Bureau of Fisheries, 1937.
12. Hubbs, Carl L. Sewage Treatment and Fish Life. *Sewage Wks. J.*, 6:1033-40 (Nov.), 1933.
13. Ellis, M. M., and Chipman, W. A. Manuscript, U. S. Bureau of Fisheries, 1936.
14. Ward, Henry B. Placer Mining on the Rogue River, Oregon, in Its Relation to the Fish and Fishing in That Stream. *Bull.* 10, Oregon State Dept. of Geology & Mineral Industries, 1938.
15. Whitaker, H. A. Director, Div. of Sanitation, Minnesota State Board of Health. Communication to the writer, Dec. 29, 1939.
16. Division of Sanitary Engineering. Stream Pollution in Wisconsin, Joint Report of the Conservation Commission and the State Board of Health of Wisconsin, Jan., 1937.
17. Warrick, L. F., Wisconsin State Sanitary Engineer. Communication to the writer, Nov. 13, 1939.
18. Klassen, C. W., Chief Sanitary Engineer, Illinois State Dept. of Health. Communication to the writer, Nov. 14, 1939.
19. Hall, George L., Chief Engineer, Maryland State Dept. of Health. Communication to the writer, Dec. 12, 1939.
20. Coastline Pollution Surveys of Michigan, June, 1933.
21. Lundie, L. The Self-Purification of Streams. *Proc. So. African Society of C. E. Sewage Works J.*, 6:1196, Nov., 1933.
22. Poole, B. A., Chief Engineer, Bureau of Sanitary Engineering, Indiana State Board of Health. Communication to the writer, Feb. 1, 1940.
23. Stevenson, W. L. The Powers, Duties and Policies of the Sanitary Water Board of the Commonwealth of Pennsylvania. *Pub. Health Rep.*, 38:2831-39 (Nov. 30), 1933, Reprint 885.
24. Greeley, S. A., Marston, F. A., and Phelps, E. B. *Report upon the Tentative Plan for Sewage Disposal for the City of New York and Specific Projects*, Oct., 1938.
25. *Report of the Ohio River Valley Compact Commission*, Oct. 11, 1938.
26. Advisory Comm. on Water Pollution, Abel Wolman, Chairman. Water Pollution in the United States, National Resources Committee, *House Document 155*, 76th Congress, 1st Session; Feb., 1939.
27. The Interstate Comm. on the Delaware River Basin. Report on the Delaware River Basin Water Pollution, *Bulletin*—Series B-1, Nov., 1938.

CARL E. GREEN, Oregon, *Chairman*  
 M. LE BOSQUET, JR., U. S. P. H. S.  
 E. S. TISDALE, U. S. P. H. S.  
 F. H. WARING, Ohio  
 L. F. WARRICK, Wisconsin  
 BEN L. WILLIAMSON, Kansas

# Analyzing Frozen Desserts

## Food and Nutrition Section

THIS year we are very happy to report excellent progress in our work. Your committee, working jointly with a similar committee from the Laboratory Section, has completed a number of standardized procedures which are to be submitted to the Association for publication as a part of *Standard Methods for the Examination of Dairy Products*. In addition, there are a number of Standard Methods upon which we are working but which have not reached the point where they are ready for publication.

### A. Standard Methods ready for publication are:

1. Sediment Testing of Frozen Desserts and Ingredients, M. E. Parker, *Referee*

2. The Microbiological Examination of Evaporated and Condensed Milks, F. W. Fabian, *Referee*, and P. A. Downs, *Associate Referee*

3. The Microbiological Examination of Dry Milks, F. W. Fabian, *Referee*, and P. S. Prickett, *Associate Referee*

4. The Microbiological Examination of Coloring Solutions, Flavoring Extracts, Fruits and Nuts, F. W. Fabian, *Referee*, and M. J. Prucha, *Associate Referee*

5. The Microbiological Examination of Sweetening Agents [Sucrose (Beet and Cane), Lactose, Cerelease, Invert Syrup, Liquid Sugar and Honey], F. W. Fabian, *Referee*, and H. H. Hall, *Associate Referee*

### B. Standard Methods in process of preparation and which will be ready for publication by next year are:

1. Determination of Butter Fat in Ice Cream and Ice Cream Mixes by Modified Babcock Technic, J. H. Shrader, *Referee*, and W. H. Martin, *Associate Referee*

2. Accurate Sampling of Ice Creams Containing Insoluble Particles (Fruit, Nuts, Pastry, etc.), J. H. Shrader, *Referee*, and P. H. Tracy, *Associate Referee*

3. Determination of Stabilizers in Frozen Desserts, J. H. Shrader, *Referee*, and F. L. Hart, *Associate Referee*

4. Phosphatase Test for Ice Cream and Ice Cream Mixes, J. H. Shrader, *Referee*, and G. Jaggard, *Associate Referee*

5. Microbiological Examination of Eggs and Egg Products Used in Frozen Desserts, F. W. Fabian, *Referee*, and Ray Schneider, *Associate Referee*

6. Microbiological Examination of Stabilizers Used in Frozen Desserts, F. W. Fabian, *Referee*

### C. Standard Methods which are only in the preliminary stages and upon which only a limited amount of work has been done as yet include the following:

1. Determination of Acidity in Frozen Desserts, J. H. Shrader, *Referee*

2. Determination of Milk Solids in Frozen Desserts, J. H. Shrader, *Referee*

3. Determination of Overrun in Frozen Desserts, J. H. Shrader, *Referee*

Standardized procedures for the methods listed under "C" may or may not be sufficiently perfected during the coming year to recommend them for publication.

F. W. FABIAN, *Chairman*

M. E. PARKER

J. H. SHRADER

JOINT COMMITTEE ON ANALYZING FROZEN DESSERTS

Organized 1936. Published reports: Year Books 1937-1938, 1938-1939, 1939-1940.

# Vitamin B Complex—The Members of This Group and Status of Methods of Assay\*

## *Food and Nutrition Section*

MITCHELL (1919), Emmett and Luros (1920), and Smith and Hendrick (1926) were the first to contend that the "water-soluble B" vitamin was of a dual nature. Since then a tremendous amount of attention has been centered on this complex. The results of investigations in a large number of laboratories have widely extended the findings of these investigators until at present there appears to be no limit to the number of factors which may be included in the vitamin B complex. The intricate interrelations of the factors comprising this complex have beset the study of any one factor with considerable difficulty. On the other hand, the availability of some of the factors in synthetic form has greatly facilitated such research. In spite of the rapid progress which has been made in the elucidation and synthesis of the various factors in the B complex, accurate methods of assay are available for only a few of them. It is the purpose of this report to discuss briefly the members of this group and to present the status of the methods of assay available at the present time.

Vitamin B, later designated vitamin B<sub>1</sub> or thiamin, was the first factor of this complex to be recognized, and was the designation given to the factor in foods or concentrates which alleviates

the symptoms of beriberi. After many years of intensive research, this vitamin was synthesized (Williams and Cline, 1936).

Although most of us are familiar with the outstanding symptoms of vitamin B<sub>1</sub> deficiency, its physiological significance in tissue respiration is of rather recent origin. The relation of thiamin to carbohydrate metabolism had its inception with the work of Lohmann and Schuster (1937), who showed that the coenzyme, cocarboxylase, required for the decarboxylation of pyruvic acid in tissue respiration is the pyrophosphoric acid ester of thiamin. This observation on the interrelation of thiamin and cellular function opened a new and significant field of research not only for vitamin B<sub>1</sub>, but for other vitamins as well.

Since there are a large number of methods available for the assay of vitamin B<sub>1</sub>, it becomes a little difficult to evaluate the merits of each in light of the present knowledge of the physiological rôle of thiamin. It is of interest to note that the only factor in the vitamin B complex for which an official method of assay has been ascribed is vitamin B<sub>1</sub>. The Second Supplement to the *United States Pharmacopoeia XI* (1939) describes a curative test which is a variation of Smith's (1930) modification of a procedure introduced by Hofmeister in 1922. Another method which has been widely used is the

---

\* Report of the Committee on Assay of Foods



growth method of Chase and Sherman (1931). In addition to the above two biological methods, there have been proposed (1) a protective, (2) a weight maintenance, and (3) a curative pigeon procedure, as well as an electrocardiographic bradycardia method with rats. These latter methods have been criticised chiefly as lacking in the analytical precision which is desired for vitamin B<sub>1</sub> assay as well as from the standpoint of specificity.

With the advent of physicochemical and microbiological methods of assay for vitamins, it is only natural that these should be applied to thiamin. The chemical estimation of vitamin B<sub>1</sub> by the thiochrome method, suggested by Jansen (1936) and further developed by Hennessy and Cerecedo (1939), and the p-aminoacetophenone procedure of Prebula and McCollum (1936 and 1939), particularly as modified by Melnick and Field (1939) and Emmett, *et al.* (1940), as well as the fermentation method of Atkin, *et al.* (1939), have given favorable results. The fermentation method appears to offer possibilities for the estimation of small amounts of thiamin.

The second member of the vitamin B complex, riboflavin, was synthesized independently by Kuhn and Karrer together with their respective coworkers in 1935. This factor is widely distributed in nature and is intimately associated with normal growth and development in both mammals and birds. Like thiamin, riboflavin plays an important rôle in certain respiratory enzyme systems. Warburg (1934) demonstrated that riboflavin is the active group of the yellow oxidation enzyme which appears to be present in varying amounts in practically all living cells. The yellow enzyme consists of a protein component and a prosthetic group of riboflavin-phosphoric acid ester. Riboflavin has also been shown to be a part

of the prosthetic group of several other enzymes.

Although the Bourquin-Sherman diet (1931) has been used for studies of riboflavin deficiency in rats, the method has been subject to criticism on the basis that the growth response may not in all cases be specific for riboflavin. Richardson and Hogan (1936), Day, *et al.* (1936 and 1937), and Wagner, *et al.* (1940) have proposed other diets which appear to be well adapted for riboflavin assay. In other methods of bioassay, the chick (Norris, *et al.*, 1936) and the dog (Axelrod, *et al.*, 1939) have served as experimental animals.

As with thiamin, both a chemical and microbiological method of assay have been developed for riboflavin. The chemical method takes advantage of the characteristic green fluorescence of riboflavin (Supplee, *et al.*, 1936 and 1939; Weisberg and Levin, 1937; and Hodson and Norris, 1939). Possible sources of error in this method are the inability to extract completely all of the vitamin from the assay substance, the possibility of loss of riboflavin at various steps of the procedure, and the possibility of nonspecific fluorescence. The microbiological method of Snell and Strong (1939), based on the production of lactic acid by *Lactobacillus casei* is a simple and rapid method which has much to recommend it. Although there is no officially recognized procedure for the assay of riboflavin, the Association of Official Agricultural Chemists has for the past two years been studying these various assay methods (Kemmerer, 1940).

Nicotinic acid, the third member of the vitamin B complex, was isolated as the amide from potent liver concentrates by Elvehjem and associates in 1937 and was found to cure canine blacktongue. Spies, *et al.* (1937), Fouts, *et al.* (1937), Harris (1937),

and Smith, *et al.* (1937) were the first to report the cure of human pellagra with nicotinic acid. This third factor of the B complex is also associated with the enzyme systems in tissue respiration. Nicotinic acid is an integral part of cozymase or coenzyme I as well as of coenzyme II.

There is no clear-cut evidence for the necessity of including nicotinic acid in the diet of rats and chicks. The extensive studies of Goldberger and associates (1928 and 1928a) demonstrated satisfactorily that canine black-tongue was analogous to human pellagra. These workers found the dog suitable for estimating the pellagra-preventive value of foods. Using dogs, Waisman, *et al.* (1940) have developed a method of bioassay for the nicotinic acid content of various food materials. By this method the nicotinic acid content of a food is determined regardless of the form in which nicotinic acid occurs.

In addition to the dog bioassay, various chemical and microbiological methods of assay have been proposed. The chemical methods (Swaminathan, 1938; Karrer and Keller, 1939; Bandier, 1939; Melnick and Field, 1940; Kodicek, 1940; and Arnold, *et al.*, 1940) available at the present time, offer possibilities for the development of a practical assay method. Knight, 1937 and 1938; Kligler and Grosowitch, 1938; Koser, *et al.*, 1938; and Dorfman, *et al.*, 1938, have found that nicotinic acid is important in the nutrition of lower organisms. At present the microbiological method of assay has not been sufficiently developed to be practical for all kinds of foodstuffs.

Vitamin B<sub>6</sub> or pyridoxine, the fourth member of the B complex to be considered, was synthesized by Harris and Folkers in 1939. Vitamin B<sub>6</sub> is a growth factor essential for the rat, chick, and dog, and prevents the pellagra-like dermatitis in rats as well as a hypo-

chromic microcytic anemia in dogs and pigs. It is ineffective in the prevention or cure of chick pellagra or canine blacktongue.

The promulgation of an acceptable method for the bioassay of vitamin B<sub>6</sub> has been hindered by the observations that fats high in linoleic acid will cure rat acrodynia about as rapidly as vitamin B<sub>6</sub>. Hence, due to this complicating effect of facts, it has been suggested (Elvehjem, 1940) that bioassays for vitamin B<sub>6</sub> would be more reliable if growth rather than the cure or prevention of acrodynia be taken as the criterion. The colorimetric determination of this vitamin is not sufficiently advanced to make its use practical as yet (Kuhn and Low, 1939, and Scudi, *et al.*, 1940).

When Woolley, *et al.* (1939 and 1939a) and Jukes (1939) independently demonstrated that the chick anti-dermatitis factor was similar to pantothenic acid, the latter became the fifth member of the vitamin B complex. Recently Williams and Major (1940) reported the synthesis of pantothenic acid. The ubiquity of this factor might suggest that it is necessary for all forms of life. However, at present our knowledge of the significance of pantothenic acid has been limited to the rat, chick, and dog. In addition to being an essential growth factor for these three species, pantothenic acid is also specific for the prevention and cure of a type of dermatitis in chicks which is not cured by nicotinic acid or vitamin B<sub>6</sub>.

Pantothenic acid may be conveniently assayed by means of a chick growth method using a heated basal ration according to the method of Jukes (1937) and of Waisman, *et al.* (1939). In addition to the above methods, Williams, *et al.* (1938) offered a yeast growth method. The yeast growth is determined by turbidity measurements in a photoelectric colorimeter. Pennington, Snell, and Williams (1940) pro-

posed a bacterial test for pantothenic acid similar to the microbiological method for riboflavin.

The status of the methods of assay for the remaining factors in the vitamin B complex is shrouded by a lack of knowledge of these entities. Before methods of assay can be promulgated, the specificity of action of the various factors must be assured. Although considerable progress is being made in this phase of the work, the realization that eluates, filtrates, extracts, and precipitates may be complex mixtures has curtailed this progress. Consequently, we shall confine our remarks to the present status of these factors.

In 1936, Elvehjem, *et al.* presented evidence for the existence of a water-soluble vitamin in liver preparations known as the alcohol-ether precipitate factor or factor W. This sixth member of the vitamin B complex is an essential growth factor for the rat and the dog, and appears to be distinct from the five factors discussed above. Whether factor W is a single entity or a complex of two or more factors is not known at the present time.

Nielsen, *et al.* (1940) reported the isolation of a crystalline substance from the filtrate fraction of liver which was highly active in the cure and prevention of the graying of hair or achromotrichia. György, *et al.* (1940 and 1940a) are of the opinion that pantothenic acid has a definite curative effect on nutritional achromotrichia. However, what substance or substances prevent the graying of hair are not known as yet.

The filtrate fraction of liver will also cure and prevent a spectacled eye condition in rats. This factor appears to be distinct from pantothenic acid and the anti-gray hair factor. On the other hand, this condition is also cured by corn oil. In this regard the relationship between the spectacled eye factor and

fat is similar to that observed in vitamin B<sub>6</sub> deficiency.

An anti-adrenal necrosis factor is also believed to be present in the filtrate fraction of liver. Adrenal necrosis has been observed in rats by Morgan and Sims (1939), Daft and Sebrell (1939), and Elvehjem (1940). Although this factor appears distinct from the anti-gray hair factor, preliminary observations indicate that it may be pantothenic acid.

Stokstad and Manning (1938) reported a growth factor for chicks, called factor U, present in the fuller's earth eluate fraction of yeast and distinct from vitamin B<sub>6</sub>. Baurenfiend, *et al.* (1938) reported a similar growth factor for chicks.

Although vitamin H, the last factor to be considered, is water soluble only upon enzymatic hydrolysis of foodstuffs containing it, its close relationship to some of the factors mentioned above make it worthy of consideration. György in 1935 used this term to designate the nutrient which prevented the so-called "egg white injury" in rats and chicks. Hegsted, *et al.* (1940) in studies on purified rations for chicks observed many cases of dermatitis which were not cured by pantothenic acid. They found that the preventive and curative factor was similar to vitamin H in distribution and properties and that potent sources of vitamin H prevented this dermatitis. The possibility that vitamin H, biotin, and coenzyme R were either identical or very closely related has been suggested by several investigators. Recently du Vigneaud, *et al.* (1940) established the identity of vitamin H with biotin.

Biotin may be determined by the "egg white injury" technic of du Vigneaud, *et al.* (1940). In addition, microbiological assay methods have been reported by Kögl, *et al.* (1936) and Snell, *et al.* (1940), which are based on

the turbidimetric measurements of yeast and clostridia.

This brief review of most of the factors in the vitamin B complex reveals the tremendous advances made in this field of study during recent years. Furthermore, these researches also reveal the increasing scope of the field of vitamins. The demonstrated functions of these chemical entities show that they have a much more profound physiological effect than is suggested by some of the specific symptoms of deficiency.

## LITERATURE CITED

- Arnold, A., Schreffler, C. B., and Lipsius, S. T. *Indust. Engin. Chem., Anal. Ed.* (in press), 1940.
- Atkin, L., Schultz, A. S., and Frey, C. N. *J. Biol. Chem.*, 129:471, 1939.
- Axelrod, A. E., Lipton, M. A., and Elvehjem, C. A. *Am. J. Physiol.*, 128:703, 1939.
- Bandler, E. *Biochem. J.*, 33:1130, 1939.
- Baurenfiend, J. C., Schumacher, A. E., Hodson, A. Z., Norris, L. C., and Heuser, G. F. *Proc. Soc. Exper. Biol. & Med.*, 39:108, 1938.
- Bourquin, A., and Sherman, H. C. *J. Am. Chem. Soc.*, 53:3501, 1931.
- Chase, E. F., and Sherman, H. C. *J. Am. Chem. Soc.*, 53:3506, 1931.
- Daft, F. S., and Sebrell, W. H. *Pub. Health Rep.*, 54:2247, 1939.
- Day, P. L., and Darby, W. J. *J. Nutrition*, 12:387, 1936.
- Day, P. L., Darby, W. J., and Langston, W. C. *J. Nutrition*, 13:389, 1937.
- Dorfman, A., Koser, S. A., and Saunders, F. J. *Am. Chem. Soc.*, 60:2004, 1938.
- Elvehjem, C. A. The Components of the Vitamin B Complex. Paper presented before the Joint Session of the Federation of American Societies for Experimental Biology in New Orleans, March 14, 1940.
- Elvehjem, C. A., Koehn, C. J., and Oleson, J. J. *J. Biol. Chem.*, 115:707, 1936.
- Elvehjem, C. A., Madden, R. J., Strong, F. M., and Woolley, D. W. *J. Am. Chem. Soc.*, 59:1767, 1937.
- Emmett, A. D., and Luros, G. O. *J. Biol. Chem.*, 43:265, 1920.
- Emmett, A. D., Peacock, G., and Brown, R. A. *J. Biol. Chem.*, 135:131, 1940.
- Fouts, P. J., Helmer, O. M., Lepkovsky, S., and Jukes, T. H. *Proc. Soc. Exper. Biol. & Med.*, 37:405, 1937.
- Goldberger, J., and Wheeler, G. A. *Pub. Health Rep.*, 43:172, 1928.
- Goldberger, J., Wheeler, G. A., Lillie, R. D., and Rogers, L. M. *Pub. Health Rep.*, 43:657, 1928a.
- György, P. Stoffwechsel und Immunologie der Haut. *Handbuch der Kinderheilkunde*, 10:45. Pfaundler-Schlossmann, Berlin, 1935.
- György, P., Poling, C. E., and Sabbarow, Y. J. *Biol. Chem.*, 132:789, 1940.
- György, P., and Poling, C. E. *Science*, 92:202, 1940a.
- Harris, L. J. *Brit. Med. J.*, 2:1243, 1937.
- Harris, S. A., and Folkers, K. *Science*, 89:347, 1939.
- Hegsted, M. A., Oleson, J. J., Mills, R. C., Elvehjem, C. A., and Hart, E. B. *J. Nutrition* (in press), 1940.
- Hennessy, D. J., and Cerecedo, L. R. *J. Am. Chem. Soc.*, 61:179, 1939.
- Hodson, A. Z., and Norris, L. C. *J. Biol. Chem.*, 131:621, 1939.
- Hofmeister, F. *Biochem. Ztschr.*, 128:540, 1922.
- Jansen, B. C. P. *Rec. d. trav. chim. Pays-Bas.*, 55:1046, 1936.
- Jukes, T. H. *J. Biol. Chem.*, 117:11, 1937.
- Jukes, T. H. *J. Am. Chem. Soc.*, 61:975, 1939.
- Karrer, P., Becker, B., Benz, F., Frei, P., Salomon, H., and Schöpp, K. *Helvet. chim. acta.*, 18:1435, 1935.
- Karrer, P., and Keller, H. *Helvet. chim. acta.*, 22:1292, 1939.
- Kemmerer, A. R. *J.A.O.A.C.*, 23:346, 1940.
- Kligler, I. J., and Grosowitch, N. *Nature*, 142:76, 1938.
- Knight, B. C. J. G. *Nature*, 139:628, 1937.
- Knight, B. C. J. G. *Biochem. J.*, 32:1241, 1938.
- Kodicek, E. *Biochem. J.*, 34:712, 1940.
- Kögl, F., and Tonnies, B. *Ztschr. f. physiol. Chem.*, 242:43, 1936.
- Koser, S. A., Dorfman, A., and Saunders, F. *Proc. Soc. Exper. Biol. & Med.*, 38:311, 1938.
- Kuhn, R., and Low, I. *Berichte*, 72:1453, 1939.
- Kuhn, R., Reinemund, K., Weygand, F., and Ströbele, R. *Berichte*, 68:1765, 1935.
- Lohman, K., and Schuster, P. *Naturwissenschaften*, 25, 26, 1927; *Biochem. Ztschr.*, 294:188, 1937.
- Melnick, D., and Field, H., Jr. *J. Biol. Chem.*, 127:505, 515, 531, 1939.
- Melnick, D., and Field, H., Jr. *J. Biol. Chem.*, 134:1, 1940.
- Mitchell, H. H. *J. Biol. Chem.*, 40:339, 1919.
- Morgan, A. F., and Simms, H. D. *Science*, 89:565, 1939.
- Nielsen, E., Oleson, J. J., and Elvehjem, C. A. *J. Biol. Chem.*, 135:637, 1940.
- Norris, L. C., Heuser, G. F., Wilgus, H. S., Heiman, V., and Ringrose, A. T. *Cornell University Agri. Exp. Sta. Bull.* 660, 1936.
- Pennington, D., Snell, E. E., and Williams, R. J. *J. Biol. Chem.*, 135:213, 1940.
- Prebula, H. J., and McCollum, E. V. *Science*, 84:488, 1936.
- Prebula, H. J., and McCollum, E. V. *J. Biol. Chem.*, 127:495, 1939.
- Richardson, L. R., and Hogan, A. G. *Missouri Agri. Exp. Sta. Bull.* 241, 1936.
- Scudi, J. V., Koones, H. F., and Keresztesy, J. C. *Proc. Soc. Exper. Biol. & Med.*, 43:118, 1940.
- Smith, D. T., Ruffin, J. M., and Smith, S. G. *J.A.M.A.*, 109:2054, 1937.
- Smith, M. I. *Pub. Health Rep.*, 45:116, 1930.
- Smith, M. I., and Hendrick, E. G. *Pub. Health Rep.*, 41:201, 1926.
- Snell, E. E., Eakin, R. A., and Williams, R. J. *J. Am. Chem. Soc.*, 62:175, 1940.
- Snell, E. E., and Strong, F. M. *Indust. & Engin. Chem., Anal. Ed.*, 11:346, 1939.
- Spies, T. D., Cooper, C., and Blankenhorn, M. A. Reported before the Central Society for Clinical Research in Chicago, Nov. 5, 1937.
- Stokstad, E. L. R., and Manning, P. D. V. *J. Biol. Chem.*, 125:687, 1938.
- Supplee, G. C., Ansbacher, S., Flanagan, G. E., and Hanford, Z. M. *J. Dairy Sci.*, 19:215, 1936.
- Supplee, G. C., Bender, R. C., and Jensen, O. G. *Indust. & Eng. Chem., Anal. Ed.*, 11:495, 1939.
- Swaminathan, M. *Indian J. Med. Res.*, 26:2, 1938.
- United States Pharmacopoeia XI.* Second Supplement 132, 1939.
- du Vigneaud, V., Melville, D. B., György, P., and Rose, C. S. *Science*, 92:62, 1940.
- Wagner, J. R., Axelrod, A. E., Lipton, M. A., and Elvehjem, C. A. *J. Biol. Chem.* (in press), 1940.

Waisman, H. A., Mickelson, O., and Elvehjem, C. A. *J. Nutrition*, 18:247, 1939.

Waisman, H. A., Mickelson, O., McKibbin, J. M., and Elvehjem, C. A. *J. Nutrition*, 19:483, 1940.

Warburg, O. *Naturwissenschaften*, 22:441, 1934.

Weisberg, S. M., and Levin, I. *Indust. & Eng. Chem., Anal. Ed.*, 9:523, 1937.

Williams, R. J., and Major, R. T. *Science*, 91:246, 1940.

Williams, R. J., Truesdail, J. H., Weinstock, H. H., Rohrmann, E., Lyman, C. M., and McBurney, C. H. *J. Am. Chem. Soc.*, 60:2719, 1938.

Williams, R. R., and Cline, J. K. *J. Am. Chem. Soc.*, 58:1504, 1936.

Woolley, D. W., Waisman, H. A., and Elvehjem, C. A. *J. Am. Chem. Soc.*, 61:977, 1939.

Woolley, D. W., Waisman, H. A., and Elvehjem, C. A. *J. Biol. Chem.*, 129:673, 1939a.

HENRY T. SCOTT, *Chairman*

FULLER D. BAIRD

PAUL L. DAY

CONRAD A. ELVEHJEM

CARL R. FELLERS

WILLIAM E. KRAUSS

ELMER M. NELSON

WALTER C. RUSSELL

# Need for Sanitary and Other Standards for the Manufacture and Sale of Fruit and Vegetable Juices\*

## *Food and Nutrition Section*

THE recent extremely rapid growth of the fruit and vegetable juice industry has been astonishing. Considering the present magnitude of the industry, it is difficult to realize that fifteen years ago the only preserved fruit juice of any commercial importance was bottled grape juice. A small amount of bottled apple, loganberry, and certain other berry juices was packed at that time, but the total quantity of preserved fruit juices packed annually was only about a million cases. In 1926, canned grapefruit juice was first packed on a commercial scale; the industry grew slowly at first, but by 1930 several hundred thousand cases of this juice were packed annually.

Tomato juice was preserved first on an important scale in 1928, and soon became the leader among juices. In 1931 pineapple juice of excellent quality was offered and as a result this product soon became very popular; it is now one of the three most important juices.

In addition to tomato, grapefruit, and pineapple juices, large quantities of apple, orange, and grape juices are packed. Other products of some commercial importance are the following:

lemon, cranberry, youngberry, loganberry, currant, tangerine, papaya, prune, plum, pomegranate, cherry, strawberry, and raspberry juices, and certain pulpy fruit beverages called nectars prepared from apricots, peaches, and pears. Until the last few years the only vegetable juices offered were tomato and sauerkraut juices. Small amounts of celery, carrot, spinach, garlic, onion, beet, and lettuce juices are also packed. A much larger quantity of these miscellaneous vegetable juices is sold as freshly extracted juice.

According to the *Western Canner and Packer*, the total quantity of canned and bottled fruit juices packed in 1939 was 23,942,814 cases. In addition, 11,581,348 cases of tomato and 233,610 cases of sauerkraut juice were packed. These figures do not include canned and bottled apple juice of which a large quantity was packed. Thus it is seen that the canned and bottled juice industry is already one of the more important canned food industries and consequently worthy of the attention of the food chemist and bacteriologist.

This rapid increase in the amount of fruit and vegetable juices consumed by the American public is undoubtedly improving the public health by a great increase in the average intake of vitamin C, minerals, and other supplementary

---

\* Report of the Committee on Foods (Except Milk).

COMMITTEE ON FOOD (EXCEPT MILK)

Organized 1932. Published reports: *Year Books* 1933-1934, 1934-1935, 1935-1936, 1936-1937, 1937-1938, 1939-1940.

food factors on the part of the average person. This improvement in the diet is sure to be reflected in the condition of the teeth and in other ways in bettering the well-being of the public.

In an industry which has grown as rapidly as the juice industry, there are likely to be certain undesirable practices. This is especially true in the apple and cherry juice industries. The quality of these products now being sold is relatively poor and the public is often disappointed because of the great lack of uniformity in quality.

On the other hand, the quality of nearly all of the tomato, grapefruit, and grape juice packed is good. In the case of these three juices, juice is a main—and not a by-product and the fruit is usually as carefully selected for juice as it is for canning. In addition, there is careful government supervision over the quality of the tomato juice packed. The regulations concerning mold count are particularly noteworthy and effective.

Much pineapple juice is by-product made from portions of the pineapple which do not make a satisfactory canned pineapple. Further, pineapple juice is usually packed in plain tin cans which are attacked by the acid of the juice, thus giving the juice an undesirable flavor. For these reasons canned pineapple juice is not nearly as good as it would be if proper care were always taken in the selection of the raw material and the container used.

#### NEED FOR REGULATION OF THE APPLE JUICE INDUSTRY

The pineapple juice industry is relatively perfect when compared with the apple juice or cider industry. For centuries, it has been common practice for farmers and fruit growers to utilize cull and dropped apples for the making of cider. A large proportion of this cider is made from wormy and partially decayed apples which have lain upon the

ground for many days or even weeks. These apples are picked up, usually by children, and then hauled to "cider mills" where they are washed, ground and pressed under highly insanitary, often filthy conditions. The price paid for "cider" apples is often as low as 10 cents per hundred pounds, and the cider sells at wholesale at from 6 to 20 cents per gallon. Such a product varies widely in quality, much of it being scarcely fit for human consumption.

The Federal Food, Drug and Cosmetic Act, and practically every state food law, prohibits traffic in fruit or vegetable juices which contain decomposed or filthy substances. The enforcement of these laws is difficult owing to the fact that it is very hard to prove by objective examination that the decomposed or filthy substance is present. Consequently, in the case of the manufacture of cider or apple juice, little effectual effort has been made to enforce these laws. About the only way to enforce the law would be by actual inspection of the cider mills or apple juice plants.

In recent years certain canning plants and many fruit growers have begun the manufacture and preservation under sanitary conditions of the juice of sound, hand-picked apples of the proper varieties. Flash pasteurization is employed for preservation; this process does not materially affect the flavor of the product. Thus a very palatable, nutritious, canned or bottled juice is produced. Since choice fruit is used in the making of this juice, it is obvious that a higher price must be obtained for it than is required for juice made from windfall apples costing only 10 or 15 cents per hundred pounds.

Many manufacturers of low-grade apple juice have attempted to improve its flavor by clarification and filtration. This procedure improves its appearance but removes much of its flavor. Clarified juice is thin and tastes like diluted apple juice.

A large proportion of the juice sold in bottles and jugs contains sodium benzoate. Some is sterilized by filtration but is not bottled under absolutely sterile conditions, and consequently is also treated with sodium benzoate.

Canned juice made from windfall apples is almost invariably packed in plain tin cans. Apple juice quickly corrodes plain tin and takes on a "metallic" or "tinny" flavor and peculiar odor. After a few months' storage such juice is almost undrinkable. Despite this fact, one chain store attempted to market, at 5 cents per 20 ounce can, juice which had been canned 18 months.

Some so-called apple juice is made from skins and cores of apples used for freezing and canning. This practice should be frowned upon.

Owing to the fact that a large proportion of all the apple juice has been of poor quality, being made from dropped apples, a great prejudice has been built up against this juice. Once a consumer has been stung by the purchase of inferior juice, packed in plain tin, or bottled after clarification and treatment with benzoate, he is not likely to buy apple juice again, no matter how highly it is recommended.

Juice of high quality made from choice apples cannot compete in price with juice from windfalls. Regulations should be enforced which will prohibit the manufacture and sale of bottled and canned apple juice made under insanitary conditions from wormy and partially decayed apples. The packing of apple juice in plain tin cans should be stopped. Apple juice should not be benzoated. Until the manufacture of apple juice is placed on a higher plane, this juice will never become a common year-round beverage.

#### THE CHERRY JUICE INDUSTRY

The cherry juice industry is equally in need of standards. Much so-called cherry "cider" or "nectar" is made

largely from citric acid, benzaldehyde, sugar, synthetic color, and water. Some is prepared from cherry concentrate reinforced with synthetic flavor and color. Much cherry juice is a by-product of the cherry freezing industry. The juice running from the cherries after they have been pitted is canned, bottled, or frozen with or without clarification. This juice is of fair flavor, but lacks color, since it is obtained without pressing.

Some unscrupulous persons have been pressing the defective cherries eliminated on the sorting belts of canneries and freezing plants. Such fruit is in such poor condition that juice of good quality cannot be produced from it.

Relatively little cherry juice has been canned, and most of that packed is of fair quality, and has been produced under sanitary conditions. However, regulations are certainly needed to control the sale of synthetic and inferior beverages from roadside stands.

#### GRAPE JUICE

The production of grape juice is largely centered in a few companies that produce a product of uniformly high quality under sanitary conditions. The quality might be improved slightly by employing flash pasteurization instead of holding pasteurization methods. The bottles should be filled completely full of hot juice. This procedure eliminates the air in the headspace and thus greatly improves the storage qualities of the juice. Air in the headspace of the bottles or cans causes the gradual oxidation of the pigments and flavoring components of grape and other fruit juices. Bottled juice sterilized by holding pasteurization contains so much oxygen in the headspace that its shelf-life is limited to a few months at most. A heavy, brown sediment soon forms and the fine flavor and bouquet disappear.



## ORANGE JUICE

Deaeration and flash pasteurization have done much to improve the quality of canned orange juice. Much of that on the market is of good quality, but the use of the best procedures is not yet universal, and all packers are not as careful as they should be of the variety, quality, and maturity of the fruit used. Higher standards for the quality of the canned juice should be maintained. Further research should be carried out in order to obtain additional knowledge concerning improved methods of preserving the juice and to evaluate existing procedures.

## OTHER FRUIT JUICES

It is impossible in a report such as this to discuss in detail the need for improvement in methods of manufacture, standards, etc., for the many other fruit juices now being prepared and preserved on a scale relatively small when compared with that of those considered above. However, taking these miscellaneous juices as a whole, it can be said that there is need for much greater uniformity in methods of manufacture and in the quality of both the juice and beverages prepared from these juices.

As rapidly as it is possible to do so, definitions and standards for the several miscellaneous juices and juice beverages should be set up by the U. S. Food and Drug Administration. Much additional research needs to be done before objective methods of determining the quality of these juices will be available for use in enforcing any standards which may be established. The success of these new industries will depend largely on whether or not such quality standards can be defined and enforced.

## VEGETABLE JUICES

Recently, a large number of miscellaneous vegetable juices have been packed in a small way. These have

been offered both as straight juices and as blends. The blends containing tomato juice seem to be more popular than those without it. Unless acid juices, e.g., sauerkraut or tomato juice, are blended in with the nearly neutral vegetable juices, or these juices are acidified in some other way, it is necessary to heat the canned or bottled juice under steam pressure in order to destroy putrefactive bacteria. Otherwise, there will always be danger of botulinus poisoning from the use of these juices. In order to eliminate danger of this kind without pressure sterilization, it is necessary to reduce the pH to 4.2 or lower.

Sauerkraut juice contains sufficient acid so that its pH is low enough to permit pasteurization at a low temperature. There is a very definite need, however, for quality standards for this juice, since it is usually diluted with water in order to reduce its acidity and improve its palatability. Various packers have various standards of acidity for the finished product thereby causing confusion on the part of the consuming public. Another point worthy of note is that the juice is usually taken from the bottom of the tank after the kraut has been removed. This juice is often saltier than that in the upper part of the tank; therefore, standards of salinity for kraut juice should also be established.

Further research should be conducted on vegetable juices in order to develop standard methods of manufacture and preservation of these juices. More work should also be done to establish objective methods of examination of these products to determine whether or not they meet standards which may be established.

Recently, "juice bars" have sprung up in certain sections of the country. Many of these sell only freshly extracted fruit juices and freshly prepared fruit beverages. Some, however, spe-

cialize in freshly prepared raw vegetable juices. Since vegetable juices are so subject to spoilage and the spoiled juices are likely to be dangerous to health, and; further, since many dangerous microörganisms may be introduced into the raw juice by the use of improperly cleaned vegetables which grow in, or on the ground, proper sanitary precautions should be taken in extracting and handling these juices. Much of the equipment employed in preparing vegetable juices is very difficult to clean. Ordinances which will insure the cleanliness of these juice bars, and the medical examination of the persons handling the juices, should be enforced.

#### CONCLUSIONS

There is a need for quality standards, both chemical and microbiological, for all juices with the exception of tomato juice, for which satisfactory standards have already been formulated. Definitions for fruit juices should be established and enforced which will prevent the sale of juice pressed from partially decayed, moldy, and wormy fruit in

insanitary plants, and that packed in plain tin cans. There is no apparent reason why methods of making mold counts on unfiltered apple, cherry, peach, plum, and apricot juices cannot be worked out. Juices packed in plain tin cans usually have a high tin content. Accurate analyses of these juices should be published.

It is evident that a great deal of chemical and microbiological research is urgently needed in order to determine basic facts needed for the establishment of proper definitions, standard practices, and sanitary regulations for the fruit and vegetable juice industries.

DONALD K. TRESSLER, *Chairman*

EDWARD MACK. CHACE

J. O. CLARKE

CECIL G. DUNN

GERALD A. FITZGERALD

FRANCIS P. GRIFFITHS

MARJORIE M. HESELTINE

GEORGE J. HUCKER

ALBERT C. HUNTER

GEORGE H. MARSH

MICHAEL G. O'CONNOR

JULIAN H. TOULOUSE

# Food Utensil Sanitation\*

## *Food and Nutrition Section*

THIS abridged report constitutes a summary of the general report which is on file with the secretary of the Food and Nutrition Section. The unabridged report is available to those members of the section who are interested in the details.

The investigation was largely financed by the manufacturers of cleaning compounds and dishwashing equipment, and this report is not submitted as final but as a progress statement of the work which is under way under the sponsorship of your subcommittee. A paper dealing with a proposed procedure for the bacteriological examination of flat surfaces is to be presented before the Food and Nutrition Section by William G. Walter† who has been coöperating with your subcommittee during the past year.

Your committee recommends on the basis of present information that no definite steps be taken by the Food and Nutrition Section in suggesting standards for food utensil sanitation until more information is available as to the accuracy of procedures. The proposed bacteriological method for the examination of flat surfaces appears to be reliable and should be given serious consideration as a standard technic. The suggested transmission of light procedure for the studying of physical efficiency of cleaning compounds needs further study, and it is the plan of your subcommittee, if reappointed, to

carry on these investigations in order that information may be available upon which this section may make a decision with respect to a final report on methods and standards for utensil cleaning and sterilizing.

Your subcommittee has been in close coöperation with corresponding committees of the Laboratory and Engineering Sections, and the assistance of these groups is acknowledged. Your subcommittee also is indebted to W. D. Tiedeman, for representatives of the New York City Health Department, the U. S. Public Health Service, the U. S. Army, and a number of municipal and state health departments who have offered suggestions and counsel during the course of the committee's investigations.

*Bacteriological Methods for the Examination of Eating Utensils*—A new procedure is proposed, to be known as the "Contact Plate" method for the enumeration of organisms on flat surfaces. This procedure involves the use of agar in a tin cover which fits in a standard Petri plate and, subsequent to contact of the agar with the surface to be examined, can be transferred to the Petri plate for incubation. Detailed comparisons on counts obtained with this procedure in contrast to various types of swabbing technics are outlined in detail. It is suggested that this procedure be given serious consideration as a standard method for the enumeration of organisms on flat surfaces of eating utensils, and in food plants in which sources of contamination are to be studied.

\* Prepared by G. J. Hucker as a Progress Report of the Subcommittee of the Committee on Foods (Except Milk).

† To be published in the May Journal.

*Ultra-violet Light*—Your committee investigated various types of ultra-violet light irradiation equipment for use in sterilizing drinking and eating utensils. The results of these investigations, the details of which are to be found in the unabridged report, indicate that ultra-violet light is efficient in destroying a large percentage of the organisms from surfaces, providing no film or debris is present. The committee is not in a position as yet to approve or disapprove the various types of equipment now available for use in dispensing this light in eating establishments. Mechanical difficulties, including ease of operation, etc., appear to be problems which yet confront many of the manufacturers of this type of equipment. The committee desires to hold in abeyance its final decision with respect to the question of recommending the use of ultra-violet light until more information is available.

*Hot Water Sterilizers*—Some attention was given to a study of the various types of hot water sterilizers now available on the market for use in sterilizing dishes. These sterilizers are heated by gas or electricity and are thermostatically controlled. They are primarily designed for use in those instances in which dishes are to be sterilized by the use of hot water. Studies have been completed on their efficiency using *Escherichia coli* as an index. The length of time required for reaching the desired temperatures has also been studied. Your committee is not in a position as yet to reach a final decision with respect to these hot water sterilizers, although for the purpose for which they are manufactured, the various types of apparatus appear to be very efficient.

*Field Survey*—An extensive field survey was carried out by your committee to determine conditions under which dishes and other types of food equipment were washed and sterilized under commercial conditions. Various meth-

ods of dishwashing were observed over a period of a year in which different routines were followed, that is, toweling, hot water rinse, chlorine rinse, various types of cleaning compounds, etc. As a result of this survey, it is the opinion of this committee that eventually a recommendation should be made with respect to minimum temperatures allowable for wash and rinse water in mechanical dishwashing. Information is needed with respect to the volume and pressure of water required in washing and rinsing. Your committee has not arrived at a decision with respect to optimum temperature and pressures to be recommended, but further information should be available.

*Mechanical Dishwashing Equipment*—Considerable attention has been given to various types and models of mechanical dishwashers, both of the spray and slusher type. No comparative information or recommendations are available on these two basic types of mechanical dishwashers. Your committee has given considerable attention to the various models of the mechanical dishwashers. No decision regarding a recommendation has been reached, but it is felt that a regulation should be enacted against certain types of mechanical dishwashers. These types or models are made by all manufacturers.

In coöperation with other Association committees a comprehensive survey is to be made and results discussed in a subsequent report of this committee. The conclusions from such a survey are necessary before a definite recommendation can be made.

*Detergents and Cleaning Compounds*—Your committee has given considerable attention to the study of cleaning and sterilizing compounds. It is apparent that action is desired by various state and municipal health authorities to control the sale of detergents used in connection with eating establishments. A method is being developed for study-

ing the efficiency of these cleaning compounds in removing standard soil from plates. This method involves a determination of the amount of light transmitted through glass plates following treatment by soiling and cleaning under standardized conditions. Although this method holds considerable promise, it is felt that much more data need to be available before a definite recommendation can be made for a standard pro-

cedure for the study of detergents. Your committee is prepared to recommend, however, that no effort be made at the present time to classify various types of detergents. It is the objective of this Section to recommend a minimum standard efficiency to be applied to all detergents.

DONALD K. TRESSLER, *Chairman*

G. J. HUCKER, *Sub-chairman*

(Dishwashing Section)

# Improving the Quality of Milk Supplies in Small Communities\*

## *Food and Nutrition Section*

A MILK supply to be of good quality must be safe, clean, and of a pleasing flavor. The milk supplies of our larger cities are generally of a satisfactory quality. This has been brought about by extensive dairy inspection and proper pasteurization. The milk supplies of our smaller communities, however, are frequently of an unsatisfactory quality. Many of them have neither sanitary control nor proper pasteurization. That the practice of pasteurizing milk is gaining in our smaller communities is shown by surveys<sup>1</sup> conducted by the Bureau of Dairy Industry. In 1924 health officials in towns having a population under 10,000 reported that 34.4 per cent of the milk was pasteurized. In 1930 this had increased only to 35.1 per cent, but in 1938 it was reported to be 59.7 per cent. A similar increase in the percentage of milk pasteurized was also shown in the larger cities. In the 10,000 to 25,000 population group 41.5 per cent, 55.2 per cent, and 65.4 per cent of the milk was reported as pasteurized in 1924, 1930, and 1938, respectively. As the size of the city increased the percentage of the milk reported as pasteurized increased. In 1938 cities having a population of 500,000 and over reported that 98 per cent of their milk was pasteurized.

The first step in controlling the quality of a milk supply is the adoption of a milk ordinance which sets forth the minimum conditions under which milk may be produced, handled, and processed. A survey conducted in 1936 by the U. S. Public Health Service<sup>2</sup> showed that only 29.1 per cent of those communities having a population of from 1,000 to 9,999 had local milk control of any kind.

This lack of proper pasteurization and sanitary control of the milk supply is frequently reflected in the quality of the milk used for human consumption in these smaller communities. This is substantiated by the fact that 66 per cent of all milk-borne outbreaks of disease which were reported to the Public Health Service during the past decade took place in communities of less than 10,000 population.<sup>3</sup>

We cannot hope to provide communities of less than 10,000 population with milk of good quality and thereby reduce materially the annual toll of milk-borne outbreaks and increase the per capita consumption of milk in the United States, unless we can introduce sanitary control over the milk supplies of these communities and extend to them proper pasteurization of milk.

Before attempting to outline how sanitary control and pasteurization can be brought to these urban communities, we should first know why it is not

---

\* Report of the Committee on Milk and Dairy Products, prepared by C. J. Babcock.

COMMITTEE ON MILK AND DAIRY PRODUCTS

Organized 1929. Published reports: *Year Books* 1930-1931, 1931-1932, 1932-1933, 1933-1934, 1934-1935, 1935-1936, 1936-1937, 1937-1938, 1938-1939, 1939-1940.

already there. Your committee believes that there are two main reasons why the milk supplies of our smaller communities are of such low quality today: (1) lack of realization on the part of the residents and officials of these communities as to the necessity and importance of adequate sanitary control of the milk supply and proper pasteurization; (2) cost of milk inspection.

Our urban communities have been slow in recognizing the danger that lurks in an unguarded milk supply. Many instances are on record where this danger was forcefully brought home by a milk-borne epidemic before it was considered necessary to take steps to better the milk supply. In spite of the numerous outbreaks of disease in urban communities, a large percentage of such communities still take the attitude that "It can't happen here." This attitude must be changed before we can hope to have sanitary control of the milk supply. Pasteurization has failed in many small communities because of the antipathy toward pasteurization. In many cases this has been due to the fact that the process was not properly performed and the flavor of the milk was adversely affected. There are communities in which an oxidized flavor, caused by contamination with copper, is so closely associated with pasteurization that this flavor is considered typical of pasteurized milk. We cannot expect to have a demand for pasteurization under such conditions.

Cost is a major point to consider in obtaining sanitary control over the milk supply of a small community. Many small communities are burdened with debts and taxes to such an extent that increasing the cost of local government is a problem of vital concern to the inhabitants. The U. S. Public Health Service reports<sup>2</sup> that: "The per capita expenditure for local milk control in the average municipality having local control in 1936 was 7.1 cents per year.

The mean varied inversely, with size of city, from 8 cents in the smallest municipalities to slightly over 5 cents in the largest." They further state: "For individual municipalities the cost ranged up to 82 cents per capita per year, but remained under 8 cents in more than two-thirds of the cities." Determining the cost of milk control from another angle, the U. S. Public Health Service<sup>2</sup> also states that: "The per gallon expenditure for local milk control in the average municipality having local control in 1936 was 0.24 cent. The mean varied inversely with size of city, ranging from 0.28 cent in the smallest municipalities to 0.16 cent or less in the largest." The municipalities in which we are primarily interested in this discussion would fall in the group having the higher costs. These costs, however, are not prohibitive. The fact is that when we consider the dangers involved in the use of an unprotected milk supply, milk control is a low cost health insurance.

It therefore appears to this committee that there are two very necessary steps to take if we are to improve the quality of milk in our small communities: (1) these communities must be awakened to the need of improving the quality of their milk supplies, and (2) some method must be devised whereby the cost of adequate milk control will not be excessive.

The first step must necessarily be accomplished through educational means. Care must be used in this educational work. The necessity for quality improvement must be brought home to the consumers without engendering fear in the present supply to such an extent that the consumption of milk will be greatly lowered. Wherever possible the use of pasteurized milk should be encouraged. Consumers should be informed that, even though they have been using the milk as produced by their favorite dairymen and

have found it satisfactory, they cannot be certain as to its future safety. They have no assurance that the producer, a member of his family, or a hired hand may not contract typhoid fever, septic sore throat, or some other disease which may readily be transmitted to them by milk. Neither do they have any insurance that Bang's disease will not enter the producing herd and that if such is the case they may not contract undulant fever by using the milk. In other words, the consumer must become conscious of the fact that milk may easily become contaminated with disease germs and that the best method of insuring themselves against milk-borne diseases is by using only properly pasteurized milk.

Pasteurization, however, must not be looked upon as a "cure all." A pasteurized milk supply is not necessarily a high quality supply. Pasteurization takes care of only one of the factors, i.e., safety, necessary for a high quality supply. It must be remembered that the quality of pasteurized milk depends largely upon the quality of the raw milk prior to pasteurization. Therefore it is necessary to have a raw supply of good quality regardless of whether it is to be pasteurized or consumed raw. To obtain clean milk of good flavor, sanitary methods of production and handling and proper feeding methods must be practised on the farm. The latter is largely an agricultural problem. A safe milk supply can be obtained by the enforcement of laws and regulations, but a high quality milk supply can be obtained only through the coöperation of those engaged in the dairy industry. Therefore the educational work should be done not alone by the control agencies of the state but by the control agencies in coöperation with the state department of agriculture and the college of agriculture through its extension force. The agricultural extension

services, through their dairy specialists and county agents, should educate the producers in the essentials of quality milk production. They should point out the necessity for quality improvement and the benefits to be derived by the producers from such improvement through increased consumption of milk, as well as a betterment of the health conditions under which they live. Such educational work prevents producer antagonism toward milk control. Whenever we can create a desire on the part of the consumer for a better quality milk and a desire on the part of the producer to supply a better quality milk, we have accomplished an important step toward a high quality milk supply. Such a condition can be brought about only by the coöperation of health authorities and agricultural workers.

As for the cost of milk control, it should be admitted at the start that the cost is prohibitive for many of our individual small communities. It should also be admitted that on the average the state milk control staffs are not sufficiently manned to cope properly with the sanitary control of milk in all small communities in the state. It therefore becomes necessary for several of these small communities to group together if they are to have adequate milk control at a reasonable cost. This grouping may be by counties or it may be an area without regard to county lines. If there is a county health department, it is well to use the county as an area, and the milk control work should become a part of the county health department. In case the county does not have a sufficient number of small communities to obtain milk control economically, county lines should not determine the boundaries of a milk control project. In other words, number, location, and size of the communities should be the main consideration in determining the size of a milk control



area rather than any political unit. Attempts to cover too large a territory will result in inefficiency, and if the area represents too small a population it will mean excessive per capita cost.

The area plan of milk control has made some progress. This has been especially true since the advent of the county health department. The Oranges of New Jersey undoubtedly represent one of the better examples of what can be accomplished by this plan. It was pointed out, however, by a committee of the International Association of Milk Sanitarians reporting on methods of improving milk supplies in small communities<sup>4</sup> that: "Many state departments of health are not empowered to undertake direct state control and have not undertaken a program to promote the establishment of adequate control on a county or district basis."

This committee recommended that: "All states which have not already done so should attempt to secure passage of state legislation which will either (a) empower the state milk sanitation authority to pass state regulations on milk sanitation which will be enforceable by county or district health departments, or (b) empower county or district boards of health to pass milk sanitation regulations." The passage of such state legislation may not be simple, but your committee believes that it can be brought about if the desire and need for milk control is fully established in our small communities. Whatever legislation is passed, it should authorize county or district boards of health to enforce sanitary regulations pertaining to the production and handling of milk.

In this report an attempt has been made to set forth some of the reasons why many of our small communities do not have adequate milk control. Suggestions have been made for bringing milk control and quality improvement to these communities. Your committee, however, believes that the

basic reason for poor quality milk in small communities is the lack of proper leadership. These small communities, as a rule, have been left to struggle alone with a problem with which they are in no position to cope. Leadership should be supplied by our state control officials. They can promote milk control on an area plan. They are in a position to guide and assist such a control project by:

1. Aiding in the selection of the area
2. Promoting the adoption of adequate and uniform milk regulations
3. Helping to secure and train inspectors
4. Making frequent checks on the enforcement of regulations
5. Giving expert assistance whenever it is needed
6. By promoting the proper pasteurization of milk

Furthermore, the state control officials are in a position to obtain the coöperation of the state extension service in forming a quality improvement project for the control area. The extension service, through its dairy specialists and county agents, should coöperate by:

1. Informing all producers of the area as to the need for quality improvement and the benefits to be derived by the producers from such improvement
2. Assisting producers in making changes in methods and equipment in order that they may meet the requirements established by control officials
3. By seeing that the pasteurization of milk is properly done, so that the process will increase rather than discourage the consumption of milk

Your committee recommends that the American Public Health Association encourage our state control officials to assume the leadership in improving the quality of milk in our smaller communities.

#### REFERENCES

1. Unpublished data, Bureau of Dairy Industry, U. S. Dept. Agri., Washington, D. C.
2. Fuchs, A. W., and Frank, L. C. Milk Supplies and Their Control in American Urban Communities of Over 1,000 Population in 1936. U. S. Public Health Service, *Pub. Health Bull.* 245, 1938.
3. Periodic Reports of Outbreaks of Diseases

Caused by Milk and Milk Products of U. S. Public Health Service (Mimeographed).

4. Report of Committee on Methods of Improving Milk Supplies in Small Communities. *J. Milk Tech.*, 1, 3:27 (Mar.), 1938.

MERRILL J. MACK, *Chairman*

C. J. BABCOCK

OSCAR BOISVERT

W. D. DOTTERER

MARIETTA EICHELBERGER

GEORGE W. GRIM

J. A. KEENAN

WILLIAM B. PALMER

GEORGE W. PUTNAM

D. M. ROGER

# Skin Irritants

## *Industrial Hygiene Section*

YOUR committee has compiled the abstracts of all available literature on occupational dermatitis which has been published from January 1, 1935 up to December 31, 1939, a period of 5 years.

This is a continuation of the work begun and so ably performed by Dr. Henry F. Smyth, Jr., which was sent out in mimeograph form some years ago. The abstracts in Dr. Smyth's work—as I understand it—were made by students of the University of Pennsylvania who were paid from funds of the FERA and NYA, but the work of the present committee was done exclusively by Dr. Warren and myself, including the translations.

We had some difficulty in getting this work published. The A.P.H.A. had no funds available for publishing it, although they deemed it worthy of publication. We then tried to have the Air

Hygiene Foundation publish this work for us, but Mr. Meller stated that while the work was praiseworthy he regretted that the large sum of money required for its publication (over \$1,000) was not available. I then appealed to the Director of the National Institute of Health, Dr. Thompson, who came to our rescue, and I am happy to report that it will now be published in the form of a *Public Health Bulletin* by the U. S. Public Health Service, and will be available upon request to the members of this committee, as well to others who are interested.

Dr. Warren and I are continuing to gather the abstracts of the available literature on occupational dermatoses and we plan to put out a similar work at least each year.

LOUIS SCHWARTZ, *Chairman*  
LEON H. WARREN

COMMITTEE ON SKIN IRRITANTS

Organized 1927. Published reports: *A.J.P.H.*, Apr., 1929, *Year Books* 1934-1935, 1935-1936.

# Ventilation and Atmospheric Pollution

## *Industrial Hygiene Section*

### Part I

#### Suggested Standards

IN submitting its tenth annual report, the committee restates its Suggested Standards which were adopted as so-called "Working Standards" by the Section on Industrial Hygiene at the Milwaukee Meeting, 1935. This will facilitate and correlate Professor Yaglou's report (below) which was prepared at the special request of the committee.

Outline of working standards for atmospheric and space environments for the maintenance of comfort, health, and efficiency, assuming altitudes not exceeding 10,000 ft. above sea level\*:

1. Cool rather than hot †—but avoiding a sense of chilliness.
2. Dry rather than damp.†
3. Still ‡ or moving depending upon physical activity.†
4. Some diversity in temperature—time and space—rather than uniformity and monotony.†
5. Foot level as warm as head level.
6. Radiant, *i.e.*, local heat source as an item in heating, preferred.
7. Shockless temperature differentials between air conditioned quarters and outer air, depending upon the length of stay indoors, *i.e.*, less differential for brief stays.
8. Essentially noiseless conditioning apparatus.
9. Minimum of 25 sq. ft. and 200 cu. ft. per person, otherwise air displacement equivalent to 1,200 cu. ft. per hour per person.
10. Reduction of obnoxious dusts, bacteria, fumes, vapors, and gases to their sub-danger thresholds.
11. Satisfactory primary sense impression upon entering the room or space.
12. Maintenance of comfortable conditions during occupancy (room comfort impression).
13. Sufficient replacement of "foul air" with "fresh air" to meet odor-comfort requirements. Entrainment or filtering out of objectionable industrial odors.
14. Ultra-violet or actinic ray effects on air or occupied space to be deferred for later consideration.
15. Intelligent supervision.

The items of compressed or rarefied air are not considered here.

The committee desires to call attention to *Report No. 76 of the Medical Research Council (Industrial Health Research Board)*, London, 1936, 109 pp., entitled, "The

\* Agreements as to the majority of the exact specifications, of interest to engineers, and correlation with A.S.H.V.E. standards were summarized in the report of this committee (*Year Book*, A.P.H.A., 1934-1935, pp. 108-112).

† Adapted from the British Health of Munition Workers' Committee, Memorandum No. 9, 1916.

‡ "Still" implies air motion under 25 ft. per minute.

Warmth Factor in Comfort at Work. A physiological Study of Heating and Ventilation," by T. Bedford. (Note especially "Equivalent Conditions of Warmth"—discussion of Scale with Chart—pp. 50-56 of this Report.)

EMERY R. HAYHURST, *Chairman*  
 PHILIP DRINKER  
 LEONARD GREENBURG  
 WILLIAM J. MCCONNELL  
 CAREY P. MCCORD

## Present Trends and Recent Developments in Air Conditioning

FIVE years ago, the American Public Health Association Committee on Ventilation and Atmospheric Pollution adopted 15 fundamental standards for the ventilation of occupied spaces and for the maintenance of comfort, health, and efficiency.

Despite the recent advances in air conditioning, these general standards are as good today as they were five years ago, except that they can be qualified better now.

Items 1 and 7 are substantiated by the view now prevailing that occupied spaces should be "cool rather than warm" in cold weather, and warm rather than cool in hot summer weather, in order to reduce harmful contrasts between the inside and outside atmosphere. There is still no general agreement as to the gradation of contrasts, in warm summer weather, according to the length of stay indoors and the prevailing outside temperature. Experience has shown that exposure to sudden temperature drops of 10° F. or more is harmful to a considerable number of persons in hot weather when the skin and clothing are wet with perspiration. The initial chilling, which usually lasts but a few minutes, was found to suppress sweating and to reduce man's ability to withstand heat for some time after returning to the hot atmosphere.

Considerable evidence has accumulated to substantiate the principle that the air should be "dry rather than damp" at all seasons of the year. Aside from the treatment of certain diseases, no one has yet been able to prove that artificial humidification of

rooms in cold weather improves the comfort or health of normal persons. The disadvantage of artificial humidification lies in damage to ordinary building materials from condensation or freezing of moisture in cold weather.

An air movement of not over 40 f.p.m. is permissible under present engineering practice when the temperature of the air current is 2° F. or less below ordinary room temperatures. Current velocities as high as 200 f.p.m. may prove desirable in hot industries, but velocities much higher than this are uncomfortable and irritating and may stir dust off the floor.

An important development in radiant heating is the use of reflective wall lining, without which the cost of such heating would be prohibitive in our cold climate of the North. Difficulties with image reflection from these surfaces and strain to the eyes have yet to be overcome.

Radiant cooling is still in the early experimental stage, in so far as American practice is concerned. Here, too, reflective wall lining is essential, and there are also difficulties with condensation of moisture and unnecessary cooling of the air by contact with the cold plates. Although radiation of heat from the human body has been studied quite extensively in the past five years, there is still no satisfactory integrating instrument for evaluating the radiation effect of non-uniform environments on the human body.

The effects of noise on human beings were recently reviewed by the Committee on Air Conditioning of the

American Medical Association. Allowable limits of sound level and methods of control were studied by accoustical and air conditioning engineers, and are given in the annual *Guide* of the American Society of Heating and Ventilating Engineers.

The advisability of specifying a definite minimum allotment for floor area and air space in item 9 of the Suggested Standards is questionable. Such allotments are intimately associated with physical, physiologic, epidemiological, psychologic, and social factors which are extremely difficult to evaluate at present. Practical values vary widely according to the nature of the ventilation problem. In railway and motor coaches, the floor area is usually about 3 sq. ft. per person, the air space 60 cu. ft., and the outside air supply between 300 and 600 c.f.h. per occupant—all far below the minima specified in Item 9. In homes and hospitals, on the other hand, a floor area of 50 sq. ft., and an air space of 400 cu. ft. per occupant are considered as the irreducible minima.

The importance of odors and of primary sense impressions upon entering a room is now appreciated more than ever before. Body or tobacco-smoke odors now constitute the limiting factor which fixes the minimum fresh air supply, not because such odors are harmful, in the medical sense, but because of their powerful esthetic effects on some persons. Although electric precipitation

holds some promise in the removal of tobacco smoke, no satisfactory substitute has yet been found for outside air in the removal of body odors. The quantity of outside air needed for odor control varies from 10 to 30 c.f.m. per person, according to socio-economic status and space allotment. The amount of recirculation depends on requirements for maintaining the temperature and humidity.

Aside from contagious wards and operating rooms, the value of ultra-violet radiation for sterilizing air of occupied rooms is still undecided.

Threshold concentrations of commonly used toxic substances, as well as control measures for maintaining sub-threshold concentrations, are fairly well known. A few books and monographs have appeared reviewing present knowledge on the subject.

The status regarding Item 4, "Some diversity in temperature" (etc.), and Item 5, "Foot level as warm as head level," has remained unaltered in recent years, and apparently no research to qualify them more precisely has been done.

Great strides have been made in industrial hygiene and toxicology under the stimulus of workmen's compensation laws, and of the Social Security Act, which furnished funds for the development or extension of industrial hygiene departments in federal, state, and local health departments.

C. P. YAGLOU

## Part II

## Standard Methods for the Examination of Air

THIS committee, organized at the Pasadena Meeting in 1934, and representing the Industrial Hygiene, Engineering, and Laboratory Sections, has reported annually in the *Year Book*, chiefly through its four subcommittees, whose reports follow.

As heretofore, comments and suggestions are invited and may be taken up with any member of the committee or

subcommittees, as befits the subject matter.

EMERY R. HAYHURST, *Chairman*

HARRY B. MELLER (*Engineering Section*)

G. L. A. RUEHLE (*Laboratory Section*)

PHILIP DRINKER

LEONARD GREENBURG

WILLIAM J. MCCONNELL

CAREY P. MCCORD

### I. Report of Subcommittee on Physical Procedures in Air Analysis

THIS committee directs attention to its report in the *Year Book 1938-1939*, entitled "Instruments and Methods for Recording Thermal Factors Affecting Human Comfort," in which very slight changes were recom-

mended as published in the *Year Book 1939-1940* (page 91).

The committee is digesting the latest advances in the field which it plans to incorporate in a revised report next year.

C. P. YAGLOU, *Chairman*

ALONZO P. KRATZ

C.-E. A. WINSLOW

### II. Report of Subcommittee on Chemical Methods in Air Analysis

#### Specific Atmospheric Contaminants—Carbon Monoxide

THE work of this subcommittee continues with the initiation in this year's report of its plan to deal with specific atmospheric contaminants in some detail. In the treatment of a specific contaminant, for example, carbon monoxide as contained in this report, we have attempted to cover the

more important methods of analysis and to evaluate them as far as is possible at this time, with the view of eventually establishing those which are most suitable and reliable as official methods. At present this latter purpose is extremely difficult due to the lack of the type of data from the labo-

ratory and the field which will permit accurate comparisons of the various methods in use.

It is not the purpose of these reports to include an exhaustive review of each contaminant, nor will a complete bibliography be given. The aim is rather to give a few easily consulted key references which will serve to open the door to the particular subject involved.

#### CARBON MONOXIDE IN AIR

Owing to the wide range of concentrations of carbon monoxide which is of interest to industrial hygienists, and also the variety of conditions under which analyses are necessary, there is no single procedure that can be designated as a universally standard method. Therefore, the following methods will be described and considered tentative: iodine pentoxide, catalytic oxidation indicators, pyrotannic acid, and gas-volumetric methods. Brief mention will be made of others. The iodine pentoxide method is described first because it may be considered as the reference method. However, since the apparatus is somewhat complicated and the manipulation required is rather difficult, it has not been adopted as a routine industrial method.

#### IODINE PENTOXIDE METHOD

The iodine pentoxide method is based on the reaction of carbon monoxide with iodine pentoxide which results in the liberation of iodine. The method is very accurate and applicable to practically all concentrations of carbon monoxide, but for concentrations higher than 0.3 per cent, special precautions must be made because iodine liberation becomes excessive. It is not suitable for use in studies where laboratory facilities are not available, although portable models have been described.

Since the carbon monoxide is determined directly by chemical reaction,

the method may be used to standardize other methods. It is emphasized, however, that the reaction of carbon monoxide and iodine pentoxide is not specific, and that numerous volatile organic substances and hydrogen will liberate iodine. Therefore, it is absolutely essential to remove all interfering substances before the sample is passed over the iodine pentoxide so that iodine liberation is produced by carbon monoxide alone. Hydrogen cannot be removed readily and if present proper allowance for it must be made.

#### *Collection of Sample*

Samples must be collected in containers and transported to the laboratory. Collection may be by vacuum bottle, by air, water, or mercury displacement, or by any other suitable means. The volume of sample depends on the concentration of carbon monoxide. A 1 liter sample should be satisfactory for most conditions.

#### *Reagents and Chemicals*

*Iodine pentoxide*—Fill a U-tube with 35 gm. of iodine pentoxide alternating with layers of glass wool. Amounts of pentoxide ranging from 4 to 40 gm. have been recommended.

*Potassium iodide*—Prepare a solution containing 5 gm. of KI in 100 cc. of water. Solutions containing from 1 to 10 per cent KI have been recommended. KI solutions should be freshly prepared.

*Sodium thiosulphate* — Prepare a standard sodium thiosulfate solution. The concentration chosen, whether 0.01 or 0.001 normal, will depend upon the amount of iodine liberated.

*Drying tubes*—Fill with calcium chloride or any other suitable drying agent.

*Hopcalite*—Use Hopcalite or any suitable agent to remove carbon monoxide from the air used to clean out the apparatus. Hopcalite is a mixture of especially prepared oxides of copper and manganese.



*Liquid air trap*—Liquid nitrogen or liquid air is used to remove interfering substances such as gasoline vapors, etc.

### Apparatus

Figure 1 is a diagrammatic sketch of the apparatus. Although there are many modifications, the principle of the set-up remains the same. The sample is drawn through the purifying train, then through the iodine pentoxide, and finally through a bubbler containing potassium iodide. Provisions are incorporated in the apparatus for cleaning with carbon monoxide-free air.

### Procedure

*Preliminary*—Pass dry carbon monoxide-free air through the apparatus at about 50 cc. per minute, heating the iodine pentoxide tube to 220–230° C. A castor oil bath is very convenient for this purpose. As soon as a constant small blank is obtained on the potassium iodide solution, the apparatus is ready for use.

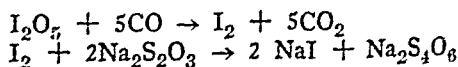
*Determination* — Pass purified air

through the apparatus, heating the iodine pentoxide to 150–160° C. Attach sampling bulb and draw the sample through the apparatus at a rate of 50 to 100 cc. per minute. As the sample is withdrawn from the sampling container, it is displaced with water. When the sample is completely displaced, the rising water actuates the float valve and air is drawn through the mercury seal. A volume of air equal to 3 to 6 times the volume of sample is drawn through to flush out the apparatus.

Remove the absorption bulb and transfer the potassium iodide-iodine solution to a flask and titrate with standard sodium thiosulfate solution, using starch as an indicator.

### Calculations

The reactions are as follows:



One cc. of 0.001 normal thiosulfate is equivalent is 0.0560 cc. of carbon monoxide at 0° C. and 760 mm. of mercury.

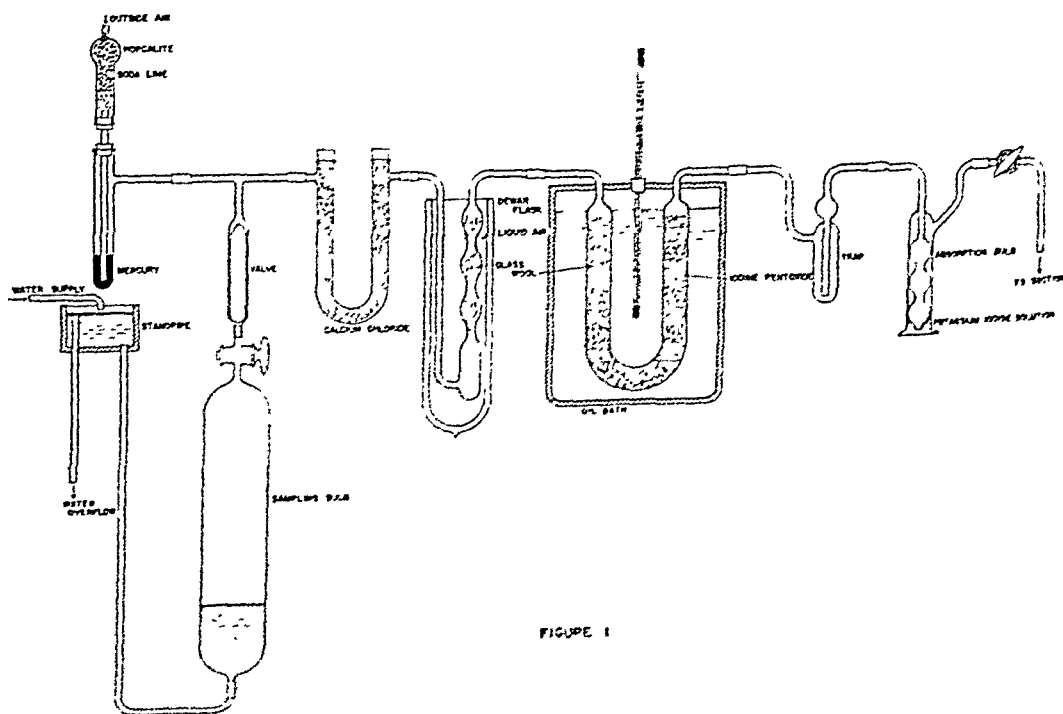


FIGURE 1

### Notes

1. Glass wool, pumice, or some other inert material is packed in with the iodine pentoxide to allow a free air flow through the absorbent. Care must be exercised, however, to have these materials free of organic matter which may liberate iodine when heated with the pentoxide. Ignited pumice has proved very effective for this purpose.

2. Too great a concentration of potassium iodide is to be avoided, as it decreases the sharpness of the end point when only small concentrations of iodine are titrated.

3. Dilute solutions of sodium arsenite keep their titer much better than corresponding sodium thiosulfate solutions and may be substituted for thiosulfate if preferred.

4. A drying tube is placed ahead of the liquid air trap to prevent excessive moisture from accumulating in it. The liquid air trap removes all interfering substances except hydrogen.

5. Liquid nitrogen is to be preferred to liquid air. Liquid air as it evaporates becomes concentrated with respect to oxygen and constitutes a potential source of danger.

6. The iodine pentoxide is heated to approximately 150° C. Temperatures ranging from 90° to 170° C. have been used. However, at low temperatures oxidation of the carbon monoxide may not be complete and temperatures above 180° may cause liberation of iodine in the absence of carbon monoxide. Iodine pentoxide of high purity should be used, and that prepared by the chloric acid method is preferable.

### CATALYTIC OXIDATION INDICATORS

Carbon monoxide may be determined by catalytically oxidizing it to carbon dioxide and measuring the heat evolved. The heat evolved usually is measured by determining the electrical potential developed in a series of thermocouples embedded in the catalytic cell.

Two devices are available, one with a scale range of 0 to 0.15 per cent and the other has a dual scale, one ranging from 0 to 0.10 and the other from 0 to 0.01 per cent. The apparatus is capable of good accuracy, and is particularly suitable for field surveys.

### Apparatus

The apparatus is contained in a carrying case about 8" x 9" x 18". The

hand driven instrument weighs approximately 15 lbs. and the motor driven one with battery about 35 lbs. It consists of a small pump driven by hand or by a motor operated by a 6 volt storage battery, drying canister, flowmeter, catalyst cell with thermocouples and millivoltmeter. One set of thermojunctions is embedded in active Hopcalite and the other set in Hopcalite that has been rendered catalytically inactive.

### Procedure

The sampling tube is placed in the atmosphere to be sampled and air at the proper rate of flow, about 4 liters per minute (as indicated on flowmeter) pulled through the cell. The concentration of carbon monoxide is read from the dial of the millivoltmeter which is calibrated in per cent carbon monoxide. There is a lag of about 1 minute when using a regular sampling tube about 5 ft. in length. A single reading, simulating a grab sample, or a series of readings simulating a recorder may be taken.

As with any physical method the instrument should be calibrated and checked at frequent intervals. Furthermore, the effect of other contaminants must not be overlooked. The drying canister is supplied to remove moisture and organic vapors. These substances tend to affect the catalyst and may give a positive or negative reading in the absence of carbon monoxide.

### PYROTANNIC ACID METHOD

Analytical procedures for carbon monoxide have been developed on the basis that carbon monoxide hemoglobin is much more stable than oxyhemoglobin and is not readily broken down on the addition of certain chemicals. When these reagents are added to blood the oxyhemoglobin is changed to a brownish-gray color whereas the carbon monoxide hemoglobin retains its cherry red color.

The method is applicable to a range

of 0.01 to 0.20 per cent carbon monoxide. It has a fair accuracy ranging from about 0.01 per cent (basis original sample) for low concentrations, to about 0.03 per cent for the higher concentrations. Its particular merit lies in the fact that the reaction is specific for carbon monoxide, and only a small amount of relatively inexpensive equipment is required.

#### *Collection of Samples*

Samples must be collected in containers. Collection may be by vacuum bottle, by air, water, or mercury displacement, or by other suitable means. A volume of 25 to 250 cc. of sample may be used. Volumes of about 100 cc. are used most commonly.

#### *Reagents*

*Pyrotannic acid*—A 1:1 mixture by weight of pyrogalllic and tannic acids; 0.04 gm. per determination.

*Blood*—May be obtained by making a puncture wound in the finger with a blood lancet (only 0.1 cc. needed). Animal blood also may be used.

*Water*—Distilled water is needed to dilute the blood.

#### *Apparatus*

*Pipette*—Bulb type with capillary stem which holds 0.1 cc. and a bulb to bring the total volume to 2 cc.

*Bottles* — Approximately 100 cc. capacity for equilibration of blood.

*Test tubes*—About  $\frac{3}{8}$ " by 3" for making color comparisons.

*Standards*—These may be prepared or purchased commercially. They represent percentages of saturation ranging from 0 to 100 in steps of 10.

*Equilibrator* (optional) — Apparatus to rotate bottles to facilitate combination of carbon monoxide with blood.

*Blood lancet*—To make puncture wound to obtain blood sample.

An apparatus consisting of standards, test tubes, pipette, blood lancet and

pyrotannic acid mixture is available commercially and weighs about 1.5 lbs.

#### *Procedure*

The sample is either collected in or transferred to a bottle of about 100 cc. volume which is then stoppered. A blood solution containing 0.1 cc. of blood diluted to 2 cc. with water is introduced into the sample bottle. Momentary removal of the stopper while adding blood solution does not cause a significant loss of gas. The bottle is then rotated in the equilibrator or by hand in a dimly lighted place for 15 to 20 minutes to allow the carbon monoxide to combine and come to equilibrium with the blood. The blood solution is then transferred to a small test tube. Approximately 0.04 gm. of pyrotannic acid is added, and the tube inverted several times to mix the contents thoroughly. The test tube is allowed to stand 25 to 30 minutes (at temperatures not below 65° F.) and compared with standards.

#### *Calculations*

The concentration of carbon monoxide in the air can be calculated or read from a graph which takes into consideration the oxygen content of the sample and also the volume used. A saturation of 10 per cent indicates 0.01 per cent carbon monoxide when a 100 cc. bottle is used and the oxygen content is about 20.9 per cent. Under the same conditions a saturation of 50 per cent would indicate 0.08 per cent carbon monoxide by volume in air. With a lowered oxygen concentration the same saturation would indicate a higher carbon monoxide concentration. The correction for volume of sample is slight for volumes of about 100 cc. The correction for the oxygen content also is not great.

#### *Notes*

1. Acid gases, such as sulfur dioxide and hydrogen sulfide, interfere with this method

and should be removed by passing the original gas sample through a suitable reagent, such as soda lime, before it is introduced into the sampling bottle.

2. A good set of standards is essential.

#### GAS-VOLUMETRIC METHODS

Gas-volumetric methods for the determination of carbon monoxide may be divided into two major groups; (1) those based on absorption, and (2) those based on oxidation or combustion to carbon dioxide.

The reagents most frequently used for absorption are (1) a solution of cuprous chloride in hydrochloric acid; (2) an ammoniacal solution of cuprous chloride; and (3) a mixture of cuprous sulfate, beta naphthol, and sulfuric acid. The efficiency of absorption by acid or ammoniacal cuprous chloride decreases with the quantity of carbon monoxide absorbed, and it is necessary to use two pipettes for the determination—one to absorb most of the carbon monoxide and the other to remove the last significant traces. The cuprous sulfate-beta naphthol reagent is more stable and will absorb carbon monoxide quantitatively until saturated. The percentage of carbon monoxide may be determined with an accuracy of 0.2 to 0.4 (basis original sample) with gas apparatus of the type in which it is usually determined by absorption.

Carbon monoxide may be oxidized to carbon dioxide by passing it over heated metallic oxides, and cupric oxide heated to 300° C. is generally employed for this purpose. The carbon dioxide formed is absorbed in an alkaline solution. The percentage of carbon monoxide in the absence of significant amounts of interfering substances may be determined with an accuracy of 0.2 to 0.3.

Carbon monoxide may be converted to carbon dioxide by burning in air or oxygen in contact with a heated surface. A platinum wire heated bright yellow by an electric current is generally used

and the procedure is referred to as the slow-combustion method. With apparatus of the type used for the analysis of fuel gases the percentage of carbon monoxide may be determined with an accuracy of 0.2 to 0.4 by the slow-combustion method. However, with specially designed apparatus, such as the Haldane, the percentage of carbon monoxide alone or in combination with one other gas, such as hydrogen or methane, may be determined with an accuracy of 0.02 to 0.03.

#### HOOLAMITE DETECTOR

This detector has been used widely in exploration work in mine fires and explosions. The method is based on the liberation of iodine from iodine pentoxide in the presence of fuming sulfuric acid. These chemicals are deposited on granular pumice stone, and air is forced over the granules with a rubber hand bulb. The originally white granules are changed to bluish green of increasing depth of color, then to violet, and finally to black, depending upon the concentration of carbon monoxide present in the atmosphere tested. The lower limit of sensitivity is approximately 0.07 per cent carbon monoxide. As organic vapors also affect the reagent the air is first passed over activated charcoal.

#### AMPOULE-TYPE DETECTOR

This detector comprises an easily crushed glass ampoule and a color comparison chart. The ampoule is a cotton covered, thin walled glass tube approximately 1.5" in length and 3/16" in diameter; it is filled with a solution of palladium chloride in a water-acetone mixture and hermetically sealed. In use the ampoule is crushed and exposed to the air for 10 minutes. If carbon monoxide is present it reacts with the palladium chloride and changes the brownish-yellow stain of the solution through yellowish black to black de-

pending on the concentration of carbon monoxide. The sensitivity range lies between 0.01 per cent and 0.1 per cent carbon monoxide. The device was designated primarily to test the air of manholes and sewers. The sensitivity of the reagent decreases with air temperature and more and more time is required for reaction. At 0° F. the reaction is retarded to such an extent that indication is unsatisfactory, even after 30 minutes' exposure of the ampoule.

#### SAMPLING AND SAMPLING DEVICES

Attention is called to the following additional method which falls in Group 1-B of last year's report.

##### 6. *British Test Paper Methods*

f. Carbon bisulfide. Colorimetric. Based on its reaction with diethylamine and copper acetate to produce a colored compound copper diethyldithiocarbamate. Sensitivity 1/120,000 (0.025 mg. per liter).

g. Carbon monoxide. Standard stains on palladium chloride paper. Sensitivity 1/12,000

h. Phosgene. Standard stains on p-dimethylaminobenzaldehydediphenylamine paper. Sensitivity 1/1,000,000 (0.004 mg. per liter).

i. Arsine. Standard stains produced on mercuric chloride paper. Sensitivity 1/250,000.

j. Chlorine. Colorimetric. Based on its reaction with o-tolidine. Sensitivity 1/1,000,000.

#### REFERENCES

1. Great Britain, Department of Scientific and Industrial Research. *Methods for the Detection of Toxic Gases in Industry.*  
 Leaflet 6—Carbon Bisulfide  
 Leaflet 7—Carbon Monoxide  
 Leaflet 8—Phosgene  
 Leaflet 9—Arsine  
 Leaflet 10—Chlorine  
 British Library of Information, 50 Rockefeller Plaza, New York.
2. Berger, L. B., and Schrenk, H. H. *Methods for the Detection and Determination of Carbon Monoxide.* *Tech. Paper 582*, Bureau of Mines, 1938.
3. American Gas Association, *Gas Chemists Handbook.*
4. Haldane, J. S., and Graham, J. L. *Methods of Air Analysis.* London, 1935, pp. 116-129.
5. Sayers, R. R., Yant, W. P., and Jones, G. W. *The Pyrotannic Acid Method for the Quantitative Determination of Carbon Monoxide in Blood and Air.* *Rep. Invest. 2486*, Bureau of Mines, 1923, 6 pp. Sayers, R. R., and Yant, W. P. *The Pyrotannic Acid Method for the Quantitative Determination of Carbon Monoxide in Blood and Air; Its Use in the Diagnosis and Investigation of Cases of Carbon Monoxide Poisoning.* *Tech. Paper 373*, Bureau of Mines, 1927, 18 pp.
6. Hoover, C. R. *The Detection of Carbon Monoxide.* *Indust. & Engin. Chem.*, 13:770-782, 1921. Katz, S. H., and Bloomfield, J. J. *Tests of an Iodine Pentoxide Indicator for Carbon Monoxide.* *Indust. & Engin. Chem.*, 14:304-306, 1922.
7. Berger, L. B., and Yant, W. P. *Test of Ampoules Filled With Palladium Salt Solution for Detecting Carbon Monoxide.* *Rep. Invest. 3030*, Bureau of Mines, 1930, 9 pp.
8. Seidell, A., and Meserve, P. W. *Gaseous Impurities in the Air of Railway Tunnels.* *Bull. 92* (June), 1914, U.S.P.H.S. Hygienic Laboratory.

F. H. GOLDMAN, *Chairman*  
 ALLAN A. COLEMAN  
 HERVEY B. ELKINS  
 H. H. SCHRENK  
 CLAYTON A. SMUCKER

### III. Report of Subcommittee on Dust Procedures in Air Analysis

#### Review and Discussion of New Developments in the Sampling and Counting of Industrial Dusts

SINCE the publication by this subcommittee of a report on "The Sampling and Analysis of Industrial Dusts" (see *A.P.H.A. Year Book*, 1935-1936, pp. 86-92), and a "Review and Discussion of Methods of Analyzing Industrial Dusts" (see *A.P.H.A. Year Book*, 1937-1938, pp. 85-90), there have been several new developments in the field of dust sampling and counting. None of these new developments can be considered as radical changes; they are merely improvements or alterations in basic instruments or methods which have previously been discussed by this committee. However, the new types of impinger sampling instruments, changes in dust counting technic, and the increased use of the electric precipitator for field sampling of dusts and fumes must be considered by all members of the industrial hygiene profession.

The following progress report is presented as a summary of some of these new developments and, while it is not comprehensive in its scope, it does deal with the subjects warranting first consideration in the drafting of a standard procedure for the sampling and analysis of industrial dusts.

#### THE BUREAU OF MINES TYPE MIDGET IMPINGER

The U. S. Bureau of Mines has published several reports on the midget impinger sampling apparatus.<sup>1-4</sup> These reports show comparative tests of the midget impinger and the standard impinger for the collection of various types of mineral dusts, lead dust, and lead fumes. They found that the midget impinger had an average sampling efficiency within 10 per cent of the standard impinger, a variation which they state might be ex-

pected between two standard impingers.<sup>4</sup> However, earlier tests showed that when the samples were counted by means of the microprojector, individual comparisons varied by as much as 50 per cent<sup>2</sup> for low dust concentrations. The U. S. Public Health Service has compared a commercial copy of the Bureau of Mines Midget Impinger with the all-glass standard impinger,<sup>5</sup> by taking simultaneous samples of mineral dusts in the atmosphere of metal mines and smelters, and found that the sampling efficiencies of the two instruments on the basis of light-field dust counts varied within the range reported by the Bureau of Mines.

The Bureau of Mines has also reported that, as a sampling instrument for lead dust, the impinger gave results comparable to those given by the electric precipitator, but that both the midget and the standard impinger gave very low collection efficiencies in the sampling of lead fumes.<sup>3</sup> The midget impinger has not been used by the Public Health Service for routine sampling of atmospheric lead dusts because of the small volume of air sampled per minute.

The number of persons using the midget impinger is steadily increasing, since the instrument has the obvious advantages of portability and independence of electrical or compressed air power supplies. However, certain precautions must be exercised in the use of the available commercial models of the instrument. First, the presence of any contaminating dust in the tube before sampling has a greater effect on the results than in the case of the standard impinger. The small volume of collecting liquid, and the small volume of air samples, are primarily re-

sponsible for this apparent increase in contamination, which becomes a matter of extreme importance if one uses alcohol as the collecting medium, since it will attack stoppers made of rubber. Neoprene, a synthetic rubber stopper, is advised by the Bureau of Mines, which also advocates the use of alcohol. Second, periodic calibrations of the instrument are essential if the vacuum gage reading is to be used as a measure of the sampling rate. This also applies to the standard impinger when a vacuum gage is used to estimate the rate of air flow. Third, each impinger nozzle must either be calibrated separately by means of a gas meter or spirometer, or all impinger nozzles in a set must be checked for uniformity. The experience of several investigators has shown that some commercial midget impinger nozzles vary appreciably from the specified diameter, as do some standard nozzles. The midget impinger nozzle acts as the orifice controlling the rate of sampling for specified negative pressures, while the standard impinger is usually operated with a flow controlling orifice in the suction device. A maximum tolerance of 3 per cent variation in the sampling rate, between different tubes of a set, is suggested. This can probably best be secured by specifying that all impinger nozzles shall be reamed to the specified size.

The midget impinger is not a model of the standard impinger. Even though it uses 1/10 the collecting liquid and samples at 1/10 the rate, the diameter of the nozzle orifice is 1 mm., while that of the standard is 2.3 mm. This means that the nozzle velocity of the air in the midget impinger is only 197 ft. per second while that in the standard is 373 ft. per second. Theoretically, for the 1 mm. orifice diameter, the sampling rate should be approximately 0.2 c.f.m. to give comparable results with the standard impinger and equiva-

lent sampling efficiencies. The published data seem to show that the difference in impingement velocity does not significantly affect the sampling efficiency of the instrument for the dusts which have been used as the basis of comparison. For other dusts, a comparison between the two instruments is necessary before results can be considered equal.

It is the opinion of this subcommittee that the midget impinger is a practical field instrument for the sampling of silica and siliceous mineral dusts which are to be counted by the low-power, light-field method. This results from the fact that the low-power count includes only the larger particles in the sample. However, it has been shown<sup>3</sup> that the midget impinger is much less efficient than the standard high velocity impinger for sampling fumes. These results obviously show that the sampling efficiency of the midget impinger decreases more rapidly with decreasing particle size than does the efficiency of the standard impinger. Consequently, the midget impinger is not recommended as a substitute for the standard impinger except for the purpose stated.

#### DUST COUNTING APPARATUS AND TECHNIC

The counting technic advocated by this subcommittee has been previously described.<sup>6</sup> Several minor changes have been suggested by various workers in the field, but they do not alter any fundamentals. These changes include increase in eyepiece magnification and inclusion of all particles collected in the count, regardless of size. In addition, Page<sup>8</sup> has described an ocular micrometer to replace the Whipple disc. This micrometer has the advantage of reducing eyestrain caused by counting at the periphery of the visual field. The difficulties in using the Sedgwick-Rafter cell are well-known. During the

past few years suggestions for overcoming these difficulties have been made by Dunn,<sup>7</sup> Hatch,<sup>9</sup> Couchman,<sup>10</sup> and Williams.<sup>11</sup> In general, these changes are aimed at facilitating cleaning and eliminating glare without affecting counts obtained.

The duties of some members of this subcommittee bring them in close contact with many of the industrial hygienists employed by industry, as well as those employed by the state health departments. They have noticed that some of these men depart from the dust counting method advocated by this committee, which was based on that employed by the U. S. Public Health Service. The Public Health Service method for making light-field dust counts<sup>12</sup> merely gives an index of the atmospheric dustiness, but this index is the one which has been correlated with available medical data on the physiological results of dust exposures. Experienced microscopists will usually obtain comparable counts on the same or similar cells, providing they use a 16 mm. (10X) objective, irrespective of the ocular magnification. This, of course, assumes the provision of light-field illumination of sufficient brilliance to reveal, without glare, all particles above the minimum size limit of visibility of a 16 mm. objective, for the collecting liquid employed. The amount of illumination necessary to secure maximum counts with the minimum eyestrain varies for each individual and can be determined only by trial. Suggestions for securing this optimum illumination have already been made.<sup>6</sup> Minor departures from the standard technic, such as the use of an ocular having more than 10X magnification, or the proper use of a binocular microscope, may reduce the eyestrain for the observer without reducing the calculated value of the dust concentration. Nevertheless, these changes may cause a change in the size of the field observed;

and a correct calibration of the microscope is imperative. A field of exactly  $\frac{1}{4}$  sq. mm. area can seldom be secured with the binocular microscope, nor can two persons having different interpupillary distances observe the same field. Since the smallest particle which is visible or can be resolved in a specific suspending fluid is a function of the objective alone in a microscopic lens system, and since the ocular merely magnifies the image resolved by the objective, any increase in ocular magnification is an increase in the so-called "false magnification" of the system and cannot increase the number of particles observed by the normal eye through the standard system.

One extremely serious and unfortunate error in dust counting technic has been fairly widely advocated, and has been used by some inexperienced microscopists making dust counts. This is the incorrect and scientifically indefensible practice of allowing dust samples to settle exactly 20 minutes in the cell before counting, and then counting only those particles which have settled. The rate of settling of any particle depends upon such obvious factors as its weight, surface area, and distance from the bottom of the cell; and upon many less obvious factors, including the viscosity of the liquid, electrostatic phenomenon and convection currents in the liquid. The probability of obtaining two samples with the same optimum settling time is very slight. The purpose of making a dust count is to determine all the dust in the cell which is visible with a specified microscopic lens system. Since it is easier to count particles which have come to rest on the bottom of the cell, the settling period should be long enough to allow the majority of the particles to settle. This can be determined by trial, but some dust samples will require more than 20 minutes settling time. A trend toward



an increase in the dust count during the counting of ten fields, in the two cells successively plated from the same sample, usually indicates that the cells have not settled long enough. The appearance of new particles in a field being observed, or the presence of a large number of particles in the liquid between the cell base and the cover slip will also indicate that a longer period is necessary to secure adequate settling. The experienced observer will not confuse such an increase in cell count with the increase normally experienced during the first few minutes of counting while the eye is accommodating itself to the field, or the increases due to convection currents, photophoresis, or evaporation of the sample.

The U. S. Public Health Service has stated,<sup>12</sup> and this subcommittee has advocated,<sup>6</sup> that

This examination is accomplished by raising and lowering the lens system so as to focus throughout the entire depth of the cell. . . . The dust is allowed to settle for 20 minutes before counting is done.

However, this statement was intended to imply a minimum settling time, and has always been so used. The misunderstanding in the field has obviously resulted from misinterpretations of the above reference.<sup>12</sup> For example, the U. S. Bureau of Mines<sup>13</sup> states that

In the counting procedure, only those particles on or very near the floor of the cell are counted . . . (and) that, for dust suspended in water in cells 1 mm. deep, the settling time should be 20 minutes. Since the number of particles revealed in the counting procedure may increase with time, this 20 minute period of time must be observed to obtain true iminger results.

Since results obtained by the latter technic cannot be correlated with existing medical data, nor compared with the results obtained by the Public Health Service technic, and since the routine counting of all cells exactly 20 minutes after plating is impractical, if not impossible, this subcommittee feels that

the Public Health Service technic should be uniformly adopted for all dust counts which may have a public health significance. Most observers believe that the percentage of unsettled particles missed when examining the cell through its entire depth is very high, but it is always possible to allow the cell to settle until the successive counts do not show a tendency to increase. If a period longer than 30 minutes is necessary for settling when the sample is collected in water, better results may be secured by using a 25 per cent alcohol collecting fluid, since a longer settling period may be caused by oil in the sample (a common contaminant in samples near rock drilling operations).

#### THE ELECTRIC PRECIPITATOR

The electric precipitator is by no means a new instrument, but its adoption for the collection of field samples has been quite recent. This has been primarily due to the appearance of commercial instruments which are compact and safe, at least in comparison with the usual laboratory instrument. While considerable data have been published on the efficiency of the electric precipitator as an instrument for sampling dusts and fumes, most of these data apply to the laboratory instrument which employed a glass collecting tube, a rigidly controlled low velocity of air flow, and a high precipitation voltage (either AC or DC), while the commercial models are modifications of the instruments developed by Barnes and Penny<sup>14, 15</sup> and employ aluminum sampling tubes, operate at a higher rate of air flow, and a lower precipitation voltage (rectified AC).

Reports from field operators vary from extreme satisfaction to severe criticism. Complaints have been made about the effects of variation in the line voltage of the power supply on sampling efficiency, the difficulty of removing samples from the collecting tubes for

chemical analysis, lack of retention of part of the sample in heavily contaminated atmospheres, and the lack of stability and sensitivity, and the difficulty of calibrating the flow measuring devices. These complaints have prevented the recommendation of the present instruments for many sampling locations where an electric precipitator would be the logical sampling device. It is understood that an unbiased and exhaustive investigation of the efficiency and performance characteristics of the available instruments under field sampling conditions is being made. Until the results of such a study are available, the sampling efficiency of all precipitators should not be assumed to be uniform and consistent.

#### REFERENCES

1. Littlefield, J. B., Feicht, F. L., and Schrenk, H. H. The Bureau of Mines Midget Impinger for Dust Sampling. *Rep. Invest. 3360*, Bureau of Mines, Dec., 1937.
2. Littlefield, J. B., and Schrenk, H. H. Dust Sampling with the Bureau of Mines Midget Impinger, Using a New Hand-Operated Pump. *Rep. Invest. 3387*, Bureau of Mines, Mar., 1938.
3. Littlefield, J. B., Feicht, F. L., and Schrenk, H. H. Efficiency of Impingers for Collecting Lead Dusts and Fumes. *Rep. Invest. 3401*, Bureau of Mines, 1938.

4. Schrenk, H. H., and Feicht, F. L. Bureau of Mines Midget Impinger. *Inform. Circular 7076*, Bureau of Mines, June, 1939.
5. DallaValle, J. M. Note on Comparative Tests Made with the Hatch and the Greenburg-Smith Impingers. *Pub. Health Rep.*, 52:1114 (Aug. 13), 1937.
6. Bloomfield, J. J. Dust Procedures in Air Analysis: The Sampling and Analysis of Industrial Dusts. *A.P.H.A. Yearbook*, 1935-1936, pp. 94-95.
7. Dunn, Karl L. Note on an Improved Cell for Dust Counting. *J. Indust. Hyg. & Toxicol.*, 21:202 (May), 1939.
8. Page, R. T. Note on a New Ocular Micrometer for Use in Dust Counting. *Pub. Health Rep.*, 52: 1315-1316, 1937.
9. Hatch, T., and Pool, C. L. Quantitation of Impinger Dust Samples by Dark Field Microscopy. *J. Indust. Hyg. & Toxicol.*, 16:177, 1934.
10. Couchman, C. E., and Schulze, W. H. A Modified Cell for Dust Counting. *Pub. Health Rep.*, 53, 9:348-350 (Mar. 4), 1938.
11. Williams, C. R. A Method of Counting Samples Taken with the Impinger. *J. Indust. Hyg. & Toxicol.*, 21, 6:226-230 (June), 1939.
12. Bloomfield, J. J., and DallaValle, J. M. The Determination and Control of Industrial Dust. *Pub. Health Bull. No. 217*, 1935, pp. 38-43.
13. Brown, C. E., and Schrenk, H. H. A Technic for Use of the Impinger Method. *Inform. Circular 7026*, Bureau of Mines, June, 1938.
14. Barnes, E. C., and Penny, G. W. An Electrostatic Dust Count Sampler. *J. Indust. Hyg. & Toxicol.*, 18, 3:167-172 (Mar.), 1936.
15. Barnes, E. C., and Penny, G. W. An Electrostatic Dust Weight Sampler. *J. Indust. Hyg. & Toxicol.*, 21, 3:259-265 (Mar.), 1939.

J. J. BLOOMFIELD, *Chairman*  
THEODORE HATCH  
R. T. PAGE  
CHARLES R. WILLIAMS

## IV. Report of Subcommittee on Bacteriological Procedures in Air Analysis

### Quantitating Gordon's Bacterial Test for Estimating Pollution of Air

THE Smith fermentation test for intestinal pollution in water has proved to be one of the most fruitful bacterial procedures in sanitary water analysis. A similar test for nasopharyngeal contamination of air we breathe promises to be equally useful in the development of sanitary ventilation.

Our committee proposed, in its report<sup>1</sup> on analytic bacteriological procedures (1937-1938), the investigation of Gordon's bacterial test for estimating pollution of air, but this procedure had already considerable history in the

archives of the American Public Health Association.

In his original communication 36 years ago Gordon stated<sup>2</sup>:

The bacteriological fact that certain streptococci are normally present in saliva to the extent of at least 10 million per cc., has been shown to be applicable to the detection of droplets of saliva in air, in much the same manner that *B. coli* is used for the detection of fecal matter in water. (All those yet tested produce acid both in glucose broth and in lactose broth.) The chief object for which this inquiry was instituted, therefore, has been attained, and a bacteriological test has been

found for the pollution of air by material given off from the human body comparable to the *B. coli* (etc.) test for the pollution of water by material derived from the same host. The streptococcus test for saliva, moreover, promises to be capable to application as an index of the possible access of moribific virus to air, in a sense similar to that in which the *B. coli* (etc.) test is an index of possible access of moribific matter to water.

From the observations so far made, the salivary streptococci appear to be comparatively rare in the open air. A streptococcus which is frequently present, both in the open air and in the air of rooms, and which is also found in dust, can be easily distinguished from the streptococci characteristic of recent samples of saliva.

The advantage of the broth plate method is that the larger as well as the smaller particles of dust floating in the air are thereby subjected to scrutiny; the disadvantage of the method is the comparative absence from the observation of the quantitative element beyond that afforded by the length of the time of exposure. In spite of this disadvantage, however, there is reason to suppose that the broth plate method will be a useful adjunct in future bacteriological examination of air.

The difficulty of quantitative volume collections admitted by Gordon has been met by improved methods. Since 1908 Winslow<sup>3</sup> and his associates have conducted quantitative studies on acid forming streptococci in air. Summarizing this experience in 1924, Winslow and Sanjiyan<sup>4</sup> state:

The use of the streptococcus as a measure of atmospheric pollution has been developed by Nolte (1914)<sup>5</sup> and by Winslow and Browne (1914)<sup>6</sup> with very encouraging results. Nolte found that cocci from saliva were almost always able to coagulate milk and to form acid in lactose and sucrose broth while cocci from the skin and the air rarely gave either of these tests. The examination of one sample of air in an unventilated laboratory showed 1 acid-forming streptococcus in about 2 liters of air. Five samples in a crowded street car gave positive tests three times, the streptococcus being present in one case in the proportion of about 1 in 4 liters, in another in the proportion of 1 in 2 liters, and in the third case in the proportion of 100 per liter. Two tests in a well ventilated department

store were negative. Four tests made out of doors gave three negative results, while in the fourth case 1 acid-forming streptococcus per liter of air was found. Winslow and Browne (1914) give the results cited in Table 1\* for a much larger series of examination.

The mouth streptococci were isolated from red colonies on litmus lactose agar plates made from filter washings, but the enrichment method was proved effective in quantitative enumeration of these organisms from tableware.

In the Third Progress Report of the Committee on Standard Methods for the Examination of Air,<sup>7</sup> these results were cited along with those obtained by Nolte,<sup>5</sup> and the value of the method was definitely suggested. In the Final Report of the Committee on Standard Methods for the Examination of Air,<sup>8</sup> the method was again recommended.

The results of these early and almost forgotten investigations have recently been brought to the fore again by new studies on air-borne infection. Wells and his associates<sup>9</sup> sought alpha hemolytic streptococci in air as indicators of nasopharyngeal pollution, and their conclusions that organisms of the streptococcus viridans group provided incriminating evidence of nasopharyngeal infection were corroborated by more extensive studies by the Air Pollution Survey of New York City.<sup>10</sup> The results have been consolidated and interpreted by Wells, Wells, and Mudd,<sup>11</sup> but attention was called to their significance in the second report of this subcommittee (1938 *Year Book*).

Biochemical studies on these alpha hemolytic nasopharyngeal streptococci from air made by Wells and Riley<sup>12</sup> revealed their relationship to the lactic acid-forming salivary streptococcus, for apparently most streptococci normally inhabiting the upper respiratory passages can ferment lactose as well

\* The streptococcus results were cited by this committee in its report for 1937-1938

TABLE 1

*Bacteria in Air**Ratio, Total Counts (37° C.) to Nasopharyngeal Streptococci*

## (1) By centrifuge (alpha streptococci on blood agar 37° C.)

	<i>Samples</i>	<i>Average Ratio</i>	<i>Strep. per Cubic Foot</i>
Outdoor air	265	251	0.029
Indoor air	1,655	138	0.225

## (2) By filter (acid forming streptococci in L.L. agar 37° C.)

	<i>Samples</i>	<i>Average Ratio</i>	<i>Strep. per Cubic Foot</i>
Outdoor air	219	276	0.114
Indoor air	818	160	0.299

## (3) By Petri plates (alpha streptococci on blood agar 37° C.)

	<i>Samples</i>	<i>Average Ratio</i>
Operating rooms	162	104

## (4) Dust (acid forming streptococci in L.L. agar 37° C.)

	<i>Samples</i>	<i>Average Ratio</i>
House dust	25	215
Street dust	25	1,157

## (1) Data from:

- (a) Wells, W. F., and Wells, M. W. Air-borne Infection. *J.A.M.A.*, 107:1698, 1936
  - (b) Pincus, S., and Stern, A. C. A Study of Air Pollution in New York City. *A.J.P.H.*, 27:321, 1937.
  - (c) Chapple, C. C., and Kenny, A. Limitation of Bacterial Contamination of Air by a New Automatic Incubator for Infants. *Am. J. Dis. Child.*, 57:1058, 1939.
- as consolidated by Wells, W. F., Wells, M. W., and Mudd, S. Infection of Air. *A.J.P.H.*, 29:863, 1939.
- (2) Winslow, C.-E. A., and Browne, W. W. The Microbic Content of Indoor and Outdoor Air. *Month. Weather Rev.*, 42:452, 1914.
  - (3) MacDonald, K. A Quantitative Bacterial Analysis of the Air of Operating and Delivery Rooms and Related Areas of a General Hospital. *Am. J. Hyg.*, 31:74, 1940.
  - (4) Winslow, C.-E. A., and Kligler, I. J. A Quantitative Study of the Bacteria in City Dust with Special Reference to Intestinal and Buccal Forms. *A.J.P.H.*, 2:663, 1912.

as produce alpha hemolysis in blood. These studies also were greatly extended in the Air Pollution Survey of New York City.

Table 1 summarizes the ratios of total counts to nasopharyngeal or salivary streptococci in some 3,000 samples collected by centrifuge, filter, or settling. The quantitative results by all three methods of collection justify Gordon's proposal of the salivary streptococcus as an indicator of air pollution. The blood agar plate provides the simplest method and apparently the most sensitive indicator shown by the ratios. The convenience and accuracy of the centrifuge method of air sampling is outweighed by the long experience required to identify alpha hemolytic colonies on blood agar tubes noted in our third re-

port, as shown by a comparison of the ratios of alpha streptococcus counts to total counts on centrifuge tubes (1 to 605) and on plates (1 to 104) from the excellent report recently published by MacDonald.<sup>13</sup> The need for a simple, convenient, sensitive, and accurate quantitative method prompted<sup>14</sup> Professor Winslow to recommend a study of Gordon's enrichment method as applied to samples collected by the centrifuge.

Samples were collected in lactose broth and five series of dilutions, representing each 5, 1, 0.2, and 0.04 cu. ft. of air were incubated at 37° C. for 24 hours and tested for acid formation with brom-thymol blue. The results obtained in outdoor country air, city air, slum home air, school air, rooms from a medical school, and normal

TABLE 2

*Presumptive Test for Nasopharyngeal Organisms in Air*  
(Lactose Fermenting Organisms)

Source	No. Samples	Percentage Positive in Given Volumes (Cubic Feet)			
		5	1	0.2	0.04
Outdoor (country)	16	61.0	20.0	8.0	....
Outdoor (city)	50	56.5	28.5	15.0	....
Schools, Grade	32	....	92.4	69.2	36.2
School, medical	36	....	79.9	43.0	18.1
Hospital (Children's Ward)	55	....	77.8	49.7	20.3
Hospital (Children's Ward)					
Irradiated	55	64.4	47.1	24.3	....
Slum homes	18	....	80.0	60.0	39.0

and irradiated air from a children's ward are given in Table 2.

Per lactose fermenting organism the normal volume of outside country air is 7.3 cu. ft.; outdoor city air 5.1 cu. ft.; grade school air 0.15 cu. ft.; medical school room air 0.6 cu. ft.; children's hospital ward air 0.47 cu. ft.; children's hospital ward irradiated 2.5 cu. ft.; slum home air 0.29 cu. ft.

Apparently the presence of lactose-fermenting organisms in a majority of cubic foot volumes results from occupancy of the semi-confined atmospheres, and their presence in a majority of the  $\frac{1}{2}$  cu. ft. volumes indicates low values for sanitary ventilation. The correlation between this presumptive test and the opportunities for human pollution are quite in harmony with the results reported by Gordon.

Before such a test is formally proposed or officially adopted it will be necessary to confirm the presence of alpha hemolytic streptococci in the positive tubes. It should also be demonstrated that such streptococci are not found except under conditions of nasopharyngeal contamination or that other acid formers interfere with the efficiency of the test. The possibility of discovering selective media and more convenient indicators offers considerable promise. Referring to a medium based

on peptone broth containing 5 per cent sterile sheep serum to which 0.05 per cent potassium tellurite and 0.0002 per cent gentian violet have been added, Garrod<sup>15</sup> states:

The tellurite serves for excluding all Gram-negative and apparently in addition some nondescript Gram-positive types, the gentian violet inhibits any staphylococci which may be present, and the growth, which takes the form of black granules without any clouding of the medium, consists always of streptococci only. These prove on subculture to be a mixture of *S. pyogenes* (when present), and *S. salivarius*. The latter are often the more numerous, a fact attributable to their profusion in the inoculum as well as to their resistance to tellurite.

Experiments are now being conducted with lactose tryptose broth containing these selective substances in the hope of improving the specificity of the medium. If practical experience over wide use confirms the results given in the table, such a test will greatly simplify the isolation and identification of alpha hemolytic streptococci without the skill required to isolate them from blood agar tubes.

#### DILUTION TECHNIC

The amount of lactose broth put in the centrifuge tube before sterilization is such that after sampling there should remain 12 cc. (about 3 cc. should be

allowed for evaporation so that approximately 15 cc. are placed in each tube). The sample fluid is divided into 6 equal parts in sterile test tubes (aluminum caps instead of cotton plugs have been found convenient). Ten cc. of sterile lactose broth is added to one of these portions and the resulting 12 cc. is again divided into 6 equal parts. This method of dilution can be continued indefinitely, but under ordinary conditions the third division is into 5 equal parts, making a series of 15 tubes, 5 each in 3 dilutions. For indoor air in cold weather when windows and doors are closed, the sampling time is 6 minutes, representing 6 cu. ft. of air. For outdoor air and during the warmer weather when windows and doors are open, 30 minute samples are collected, representing 30 cu. ft. Under these conditions of sampling, less than 50 per cent of the highest dilution will be positive and more than 50 per cent of the undiluted broth portions will be posi-

tive. The middle dilution should approach nearer 50 per cent than either of the others. This is the ideal quantitative combination.

#### MOST PROBABLE DILUTION POSITIVE

If 30 minute samples are collected and diluted in accordance with the above system, the computation of the most probable dilution positive is simply obtained without complicated mathematical formulae or tables. The number of organisms per cubic foot corresponding to the most probable dilution containing one organism can be read directly from the left hand column of Table 3. Likewise the average number of tubes positive can be interpreted with decimals from the main body of the table.

Where 5 minute samples are collected, it is assumed that the first 5 tubes in a sample would have been positive and so the number observed to be positive is increased 5 before consulting the

TABLE 3  
*Organisms per Cubic Foot per Average Positive Tube in Dilution Series*

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.040	.041	.043	.044	.046	.047	.049	.050	.052	.054
1	.055	.057	.059	.062	.063	.065	.067	.069	.071	.076
2	.078	.079	.081	.084	.087	.090	.096	.096	.099	.102
3	.105	.109	.113	.116	.120	.124	.128	.132	.137	.141
4	.145	.150	.155	.160	.165	.171	.176	.182	.188	.192
5	.200	.207	.213	.220	.228	.235	.242	.251	.259	.267
6	.276	.285	.294	.308	.314	.324	.335	.346	.357	.379
7	.391	.394	.407	.420	.434	.449	.462	.478	.493	.509
8	.526	.544	.561	.579	.598	.618	.638	.659	.680	.703
9	.726	.750	.775	.800	.826	.853	.881	.910	.940	.960
10	1.00	1.03	1.07	1.10	1.14	1.18	1.21	1.25	1.30	1.34
11	1.38	1.43	1.47	1.54	1.57	1.62	1.68	1.73	1.79	1.85
12	1.91	1.97	2.04	2.10	2.17	2.24	2.31	2.39	2.47	2.55
13	2.63	2.80	2.81	2.90	2.99	3.09	3.19	3.30	3.40	3.52
14	3.63	3.75	3.87	4.00	4.13	4.27	4.41	4.55	4.70	4.85
15	5.00	5.17	5.34	5.55	5.60	5.88	6.07	6.27	6.47	6.69
16	6.90	7.13	7.36	7.71	7.85	8.11	8.38	8.65	8.93	9.23
17	9.53	9.84	10.2	10.5	10.8	11.2	11.6	11.9	12.3	12.7
18	13.2	13.6	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.6
19	18.2	18.8	19.4	20.0	20.7	21.3	22.0	22.8	23.0	24.3
20	25.0	25.8	26.7	27.8	28.0	29.4	30.3	31.3	32.4	33.4
21	34.5	35.7	36.8	38.6	39.2	40.6	41.9	43.3	44.7	46.1
22	47.7	49.2	50.9	52.6	54.2	56.0	57.8	59.7	61.7	63.7
23	65.8	68.0	70.2	72.5	74.8	77.3	79.8	82.4	85.1	87.9
24	90.8	93.8	96.9	100.	103.	106.	110.	113.	117.	121.
25	125.	129.	133.	138.	140.	146.	151.	156.	161.	167.

table. For example, if a series of dilutions from indoor air (15 tubes) show 8 tubes positive, it is assumed that 13 tubes would have been positive, if a 30 minute sample had been diluted according to this series. The number of organisms per cubic foot would be read as 2.63. Suppose this was one of a number of samples giving 8, 4, 11, 10, 5, and 7, the average number of tubes positive is 7.5, but since we assume 5 lower dilutions would be positive, the average dilution positive is 12.5 which corresponds to 2.24 organisms per cubic foot.

## REFERENCES

1. Wells, W. F., Phelps, E. B., and Winslow, C.-E. A. Report of Sub-committee on Bacteriological Procedures in Air Analysis. *Analytic Bacteriological Procedures. Year Book, 1937-1938*, Supp. to *A.J.P.H.*, 28:90, 1938.
2. Gordon, M. H. Report on a Bacterial Test for Estimating Pollution of Air. *Rep. M. Off., Local Gov. Bd.* (London), 32:421, 1903-1904.
3. Winslow, C.-E. A. A New Method of Enumerating Bacteria in Air. *Science*, N. S., 28:28, 1908.
- Winslow, C.-E. A., and Robinson, E. A. An Investigation of the Extent of the Bacterial Pollution of the Atmosphere by Mouth Spray. *J. Infect. Dis.*, 7:17, 1910.
- Report of the Committee on Standard Methods for the Examination of Air. *A.J.P.H.*, 20:357, 1910.
- Winslow, C.-E. A., and Baskerville, C. The Air of New York City Schools. *Report of the Committee on School Inquiry*, Board of Estimate and Apportionment, 3:607, 1911-13.
4. Winslow, C.-E. A., and Sanjiyan, D. H. Acid-forming Streptococci as Indices of Fomites Pollution. *J. Bact.*, 9:513, 1924.
5. Nolte, A. G. The Identification of the Most Characteristic Salivary Organism and Its Relation to the Pollution of Air. *Ann. Missouri Bot. Garden*, 1:47, 1914.
6. Winslow, C.-E. A., and Browne, W. W. The Microbic Content of Indoor and Outdoor Air. *Monthly Weather Bureau*, 42:452, 1914.
7. The Third Progress Report of the Committee on Standard Methods for the Examination of Air. *A.J.P.H.*, 5:250, 1915.
8. The Final Report of the Committee on Standard Methods for the Examination of Air. *A.J.P.H.*, 7:54, 1917.
9. Wells, W. F., and Wells, M. W. Air-borne Infection. *J.A.M.A.*, 107:1698, 1936.
10. Pincus, S., and Stern, A. C. A Study of Air Pollution in New York City. *A.J.P.H.*, 27:321, 1937.
- Buchbinder, L., Solowey, M., and Solotorovsky, M. Alpha Hemolytic Streptococci of Air. *A.J.P.H.*, 28:61, 1938.
11. Wells, W. F., Wells, M. W., and Mudd, S. Infection of Air. *A.J.P.H.*, 29:863, 1939.
12. Wells, W. F., and Riley, R. The Alpha Streptococcus as an Indicator of Nasopharyngeal Pollution. Unpublished paper read before A.P.H.A., Oct., 1936, and quoted by Wells, W. F., and Wells, M. W. Air-borne Infection. *J.A.M.A.*, 107:1698, 1936.
13. MacDonald, K. A Quantitative Bacterial Analysis of the Air of Operating and Delivery Rooms and Related Areas of a General Hospital. *Am. J. Hyg.*, 31:74, 1940.
14. Wells, W. F., and Wells, D. Quantitating Gordon's Bacterial Test for Estimating Pollution of Air. *J. Bact.*, 39:755, 1940.
15. Garrod, L. P. Inhibitory Selective Culture Media I. A review of methods proposed for bacterial cultivation which utilize differential inhibition. II. Original observations: The selective cultivation of *Streptococcus pyogenes*. *St. Barth. Hosp. Rep.*, 66:203-252, 1933.

W. F. WELLS, *Chairman*

EARLE B. PHELPS

ELIZABETH CHANT ROBERTSON

C.-E. A. WINSLOW

# Analyzing Frozen Desserts and Ingredients\*

## *Food and Nutrition and Laboratory Sections*

THE Standard Methods Committee for Analyzing Frozen Desserts and Ingredients was organized as a joint committee of the Food and Nutrition and Laboratory Sections in 1937 following the adoption of a recommendation made by William B. Palmer<sup>7</sup> at a joint session held at the 1936 Annual Meeting to establish a committee for preparing standard methods for examining both frozen desserts and ingredients. Considerable ground work had to be laid. Then refereeships were established as follows:

A. H. Robertson—Microbiological Examination of Frozen Desserts

F. W. Fabian—Microbiological Examination of Ingredients

James Gibbard—Microbiological Examination of Gelatin and Stabilizers

Milton E. Parker—Sediment Testing of Frozen Desserts and Ingredients

J. H. Shrader—Chemical Methods of Examining Frozen Desserts and Ingredients (in collaboration with other organizations)

Associate refereeships were established and work was begun. The present associate referees on the committee are: P. A. Downs; Harlow H. Hall; F. L. Hart; A. H. Martin; Paul S. Prickett; M. J. Prucha; Roy Schneider and P. H. Tracy. Up to a year ago the committee issued only progress reports<sup>1-8</sup> which have been published in the *Year Books*. Last year the com-

mittee announced that several methods were ready for distribution in mimeographed form as proposed methods. These have since been distributed, and the many comments and criticisms received have been given consideration.

The committee now recommends to the Food and Nutrition and the Laboratory Sections for publication as Part II of the forthcoming 8th Edition of *Standard Methods for the Examination of Dairy Products* the following methods:

1. Microbiological Examination of Plain Ice Cream and Frozen Desserts (Manuscript prepared by A. H. Robertson, Ph.D.)
2. Microbiological Examination of Ingredients (Manuscripts prepared under the supervision of F. W. Fabian, Ph.D.)
  - a. Microbiological Examination of Evaporated and Condensed Milks—P. A. Downs, Ph.D.
  - b. Microscopical Examination of Powdered Milks—Paul S. Prickett, Ph.D.
  - c. Microscopic Examination of Sweetening Agents—Harlow H. Hall
  - d. Microscopic Examination of Coloring Solutions, Flavoring Extracts, Fruits and Nuts—M. J. Prucha, Ph.D.
  - e. Microscopic Examination of Egg Products (Tentative)—Roy Schneider
3. Sediment Testing of Frozen Desserts and Ingredients (Manuscript prepared by Milton E. Parker)

The committee expects to distribute in mimeograph form during the year three proposed methods prepared under the

\* Report of the Joint Standard Methods Committee.



direction of J. H. Shrader, Ph.D., Referee for Chemical Methods, as follows:

1. Determination of Stabilizers in Frozen Desserts—F. L. Hart
2. Determination of Butterfat by a Modified Babcock Technic—A. H. Martin, Ph.D.
3. Accurate Sampling of Ice Cream Containing Insoluble Particles—P. H. Tracy, Ph.D.

In 1939 Mr. Gibbard found it necessary to resign his refereeship, although he continues as a member of the committee. His report on the Bacteriological Examination of Gelatin has been accepted by the committee and referred to Dr. Fabian to be included among methods for stabilizers which will be prepared in the near future for mimeographed distribution as proposed methods for comment and criticism.

The Chairman believes that the committee members are to be congratulated on having prepared methods in this field where standard methods were lacking and he requests that the committee be

continued until the methods now in preparation are completed.

#### REFERENCES

1. Fabian, F. W. Report of the Committee on Analyzing Frozen Desserts (Food and Nutrition Section). *A.P.H.A. Year Book*, 1938-1939, pp. 34-35.
2. Fabian, F. W. Report of the Committee on Analyzing Frozen Desserts (Food and Nutrition Section). *A.P.H.A. Year Book*, 1939-1940, pp. 75-76.
3. Fabian, F. W. Report of the Committee on Analyzing Frozen Desserts (Food and Nutrition Section). *A.P.H.A. Year Book*, 1939-1940, pp. 75-76.
4. Mickle, Friend Lee. Analyzing Frozen Desserts and Ingredients. Report of Joint Standard Methods Committee of the Laboratory and Food and Nutrition Sections. *A.P.H.A. Year Book*, 1937-1938, pp. 98-100.
5. Mickle, Friend Lee. Analyzing Frozen Desserts and Ingredients. Report of Joint Standard Methods Committee of the Laboratory and Food and Nutrition Sections (Laboratory Section). *A.P.H.A. Year Book*, 1938-1939, pp. 75-77.
6. Mickle, Friend Lee. Analyzing Frozen Desserts and Ingredients. (Report of the Joint Standard Methods Committee of the Laboratory and Food and Nutrition Sections). *A.P.H.A. Year Book*, 1939-1940, pp. 105-107.
7. Palmer, William B. Report of the Committee on Milk and Dairy Products. *A.P.H.A. Year Book*, 1936-1937, pp. 53-62.
8. Shrader, J. H. Analyzing Frozen Desserts and Ingredients. Report of the Joint Standard Methods Committee of the Food and Nutrition and Laboratory Sections (Food and Nutrition Section). *A.P.H.A. Year Book*, 1937-1938, pp. 49-51.

FRIEND LEE MICKLE, *Chairman*, Joint Committee

*Representatives from the Laboratory Section*

FRIEND LEE MICKLE, *Chairman*

JAMES A. GIBBARD

A. H. ROBERTSON

*Representatives from the Food and Nutrition Section*

F. W. FABIAN, *Chairman*

M. E. PARKER

J. H. SHRADER

# Biological Products

## *Laboratory Section*

THE Committee on Biological Products wishes to draw attention to certain matters of a general nature which it believes should be considered, particularly at this time of national emergency. The first of these is the matter of immunization against smallpox and diphtheria. Although the incidence of smallpox is currently at a relatively low level, there are still enough cases to serve as focal points for epidemics, particularly at a time when mobilization, industrial expansion, etc., lead to more than the normal number of changes of place of residence. It would therefore seem desirable to carry on vaccination against smallpox more intensively than usual, to the end that even small epidemics may be averted. Similarly, the incidence of diphtheria can be still further reduced by the more general application of prophylactic immunization. In both of these diseases, the cost of immunization is so much less than the cost of caring for cases that there can be no room for argument as to the desirability of prophylactic measures.

The remarkable efficacy of the sulfonamide derivatives in the treatment of meningococcic and pneumococcic infections has resulted in definite decrease in the use of specific sera. Whether this will render the manufacture of these

sera in large volumes so costly that it will no longer be economically feasible remains to be seen; this committee trusts that this will not occur until the value of chemotherapy is more clearly defined. So far as we are aware, there has been no opportunity to test the sulfonamide derivatives in an epidemic of meningitis. Epidemic outbreaks of pneumonia due to drug-fast or drug-resistant strains are also theoretical possibilities, and in these, serum would seem to offer the best if not the only effective form of therapy. At present the use of antimeningococcic serum is so limited that it is well-nigh impossible to determine the therapeutic efficacy of the sera currently available and to study methods of improvement.

In view of the forthcoming books compiled by other Standard Methods committees, it should be stated that similar publications are unnecessary in our field, inasmuch as our standard methods are those prescribed in the federal regulations set up by the Division of Biologics Control of the National Institute of Health.

ELLIOTT S. ROBINSON, *Chairman*

ROBERT D. DEFRIES

W. T. HARRISON

RALPH S. MUCKENFUSS

STANDARD METHODS COMMITTEE ON BIOLOGICAL PRODUCTS

Organized 1933. Published reports: *Year Books* 1934-1935, 1937-1938

# Examination of Dairy Products\*

## Laboratory Section

THE Laboratory Section Committee on Standard Methods for the Examination of Dairy Products wishes to present the revised manuscript of its section of the Association report known as the Standard Methods for the Examination of Dairy Products, for the approval of the Section † as a part of the eighth edition of this report. This has been prepared because the present edition will be exhausted before the next Annual Meeting of the Association, and also because of a desire to include the methods for the examination of frozen desserts as prepared by the committee of which Dr. Mickle is Chairman.

Only minor changes have been introduced in the revision of the Milk, Cream, and Butter Sections of the report. The most important recommended change is that of making incubation of agar plates at 32° C. for 48 hours optional. It has been recognized for some time that counts obtained at 32° C. were more likely to give a correct idea of the number of bacteria present in dairy products, with less tendency for the counts to fluctuate from unavoidable variations in temperature of incubation, than counts obtained at 37° C. Some cities introduced 32° C. incubation in 1939 when they introduced the new standard agar for milk work, and they are naturally desirous that their official control work

be recognized as such by the Association.

We now have reasonably priced laboratory type incubators that can be operated at 32° C. economically. Perhaps the best one that has come to our attention is the one made by the Scientific Supplies Company of Seattle, Wash., but other satisfactory 32° C. incubators are also available. In some cases these incubators are placed in air conditioned rooms, thereby avoiding any necessity for cooling the incubation chamber.

Other changes have been made in the text to clarify meanings, and there has been a development of methods for testing the sterility of dairy equipment and utensils. It was thought desirable to include certain new procedures in the body of the report at this time to make them immediately available to the membership of the Association for criticism and suggested improvements. Wherever procedures are new they are labelled—*Tentative*.

The committee named below has been assisted in this revision by the following Associate Referees: H. R. Thornton, C. C. Carson, G. J. Hucker, I. F. Huddleson, W. A. Hagan, J. H. Shrader, E. H. Parfitt, and F. W. Fabian.

R. S. BREED, *Chairman*  
MAC H. MCCRADY  
A. H. ROBERTSON  
W. S. FRISBIE  
A. J. SLACK  
S. R. DAMON  
W. D. TIEDEMAN  
R. V. STONE

\* Report of the Standard Methods Committee.

† Manuscript approved by the Joint Meeting of the Laboratory, and Food and Nutrition Sections, October 9, 1949.

# Terminology for New Pneumococcus Types\*

## Laboratory Section

A TOTAL of 24 pneumococcus types are soon to be described in separate studies by Kauffmann, Mørch, and Schmith and by Walter. Since the description of new pneumococcus types provides a foundation for the use of type strains in pneumonia diagnosis and therapy, a unified terminology is required, as has been suggested by Kauffmann. Such a terminology pre-

pared with the aid and approval of Walter, is presented below.

The combined recommended terminology emphasizes the terms reported by Walter for strains that have the least relationship with other pneumococcus types, and emphasizes the terms reported by Kauffmann for organisms with cross-reactions judged to be of importance in classification. Pneumococcus strain 6a

TABLE

*Terminology Recommended for Newly Reported Pneumococcus Types and Designations by Walter and by Kauffmann*

Type			Sub-type		
Recommended Combined Terminology	Walter's Terms	Kauffmann's Terms	Recommended Combined Terminology	Walter's Terms	Kauffmann's Terms
26	..	(38)	6B	..	6B
30	(42)	..	7A	..	7A
33	33	(9V)	7B	(48)	7B
34	(41)	34	7C	..	7C
35	35	35	9L	(49)	9L
36	36	36	10A	(34)	10A
37	37	37	11A	(43)	11A
38	38	..	15A	(30) Cooper	15A
39	39	..	15B	..	15B
40	40	(33A)	18A	(44)	...
			19A	..	19A
			23A	(46)	23A
			24A	(45)	...
			35A	(47)	35A
			40A	..	(33)

\* Report of Referee on Recognition of Pneumococcus Types Associated with Pneumonia for the Standard Methods Committee on Diagnostic Procedures and Reagents.

(Cooper) is adopted as the type strain for pneumococcus Type 6, and pneumococcus strain 6b (formerly 26) is

discarded as being identical with strain 6a. A new strain recognized by Kauffmann as 6B is added as a sub-type of Type 6. Type 30 of the Cooper classification is believed to be identical with 15A as recognized by Kauffmann and since the antigenic similarity of Types 15 and 30 (Cooper) has already led to difficulties in their separation, the classification of Type 30 (Cooper) as 15A (Kauffmann) is recommended. Numbers 26 and 30 of the Cooper classification, which are not in use, are reassigned to new organisms recognized by Kauffmann and by Walter separately. Type 33 reported by Walter, *et al.*, is adopted as Type 33 in the recommended classification. It corresponds to sub-type 9V described first by Vammen and discussed by Kauff-

mann, and it differs from Type 33 described by Kauffmann, and mentioned incidentally in connection with the description of 9L, 9V, and 9N, by Vammen.

Types 34 to 40 inclusive and the sub-types in the recommended column are readily correlated with their corresponding microorganisms in Walter's and Kauffmann's studies by means of the table.

The use of the 24 new strains in the production of diagnostic sera and therapeutic serum will extend the application of sera therapy to patients now denied it; and should indicate the extent to which interrelationships among pneumococci may profitably be employed for classification.

W. D. SUTLIFF, *Referee*

# Study of Methods of Estimating Population

## *Vital Statistics Section*

IN its first report to the Vital Statistics Section, made at the 1939 Annual Meeting of the American Public Health Association, the committee suggested the possibility of utilizing school statistics as a basis for post-censal estimates of population. In the spring of 1940 the chairman of this committee outlined a WPA project under the joint sponsorship of the New York State Education and Health Departments for the purpose of tabulating and analyzing in detail the material available in the New York State school census. The preliminary work, which has already been completed, consisted of a check of the census returns from 7,000 school districts, the tabulations by single years of all children under 17 years by counties and incorporated places of 4,500 and over; the tabulation by age of school children according to certain school attendance groups; public school in district of residence, public school outside district of residence, and so on, by counties, supervisory school districts and incorporated places of 4,500 population or over.

The next step in this project is a comparison between the school and the corresponding federal census figures.

Such a comparison will have to await the tabulation of the federal census returns according to age. The completion of this study will make it possible to ascertain to what extent a well conducted school census (such as the chairman believes is represented by the census in New York State) may be used not as the sole means but as an important aid in making post-censal estimates.

As for a definitive solution, the committee is obliged to repeat the observations made in its first report; namely, that, short of a universal register of population (the merits of which by the way, were so eloquently presented before this Section by Dr. Stuart Rice), a quinquennial federal census offers the most immediate hope.

J. V. DEPORTE, *Chairman*  
THOMAS W. CHAMBERLAIN  
EMERY M. FOSTER  
FRANK LORIMER  
CHARLES L. MOSHER  
LOWELL J. REED  
HENRY S. SHRYOCK  
CONRAD TAEUBER  
LEON E. TRUESDELL  
ROBERT G. WEBSTER

COMMITTEE FOR THE STUDY OF METHODS OF ESTIMATING POPULATION  
Organized 1939. Published report: *Year Book* 1939-1940.

# Utilization of Vital Statistics Data During the 1940 Census Period

## *Vital Statistics Section*

CONSIDERABLE interest was disclosed in the report of your committee which was presented at the meeting of the Association in Pittsburgh last year. Because of the timeliness of the report, Dr. Halbert L. Dunn, Chief Statistician for Vital Statistics of the U. S. Bureau of the Census, published the report on December 11, 1939, in the Bureau's *Special Report* series, Vol. 7, No. 67. For this reason, it is believed the report received wider distribution than is usual for reports of section committees. In March, 1940, your chairman circularized each state bureau of vital statistics relative to preparations which were being made for special studies during the census period. The response was most encouraging and showed that at that time nearly every state was proposing to undertake one or more projects in connection with the 1940 census.

In general, the proposed studies are those included in the report of the committee last year. Nearly every state indicated that it expected to follow up the results of the Census Birth-Registration-Test which the Vital Statistics Division of the Bureau of the Census has undertaken. This project will be most useful in evaluating the completeness of birth registration and stimulation for its improvement. The most frequently mentioned project after the follow-up of the Census Birth-Registra-

tion-Test was the computation of age specific death rates which are neglected so often in vital statistics reports. Many states indicated that birth and death rates would be recalculated for the decade 1930-1939 on the basis of revised estimates of population.

Your chairman presented a report of these plans at the first National Conference of State Registration Officials which was held in Washington April 9-12, 1940.<sup>1</sup> The discussion following this report reiterated the desirability of making available to the public detailed tabulations of vital data. The publication of statistics by small geographic subdivisions such as counties was mentioned as being of special value to health officers in the appraisal of health progress and problems. The issuing of detailed population data and statistics relating to social economic status of various geographic units within the state was suggested. At this meeting considerable interest was shown at the discussion of the construction of life tables, especially the short method for constructing an abridged life table suggested by Drs. Lowell J. Reed and Margaret Merrell in the *American Journal of Hygiene* for September, 1939. Because of this interest the Division of Vital Statistics of the Census Bureau secured permission to reprint this valuable paper as *Special Report* No. 54 of Vol. 9. As a consequence, your chair-

man believes that many states will find it possible to construct life tables on a resident basis not only for important segments of the population for the state as a whole, but for the larger urban and rural areas of their state.

Such was the situation in the spring of this year. It indicated that registration officials throughout the country were preparing to make considerable use of the opportunity which the 1940 census provided in utilizing the valuable statistical data which accumulates in their offices. Since May the requests for certified copies of birth certificates for proof of citizenship and age have increased so that nearly every registration office in the country has been overtaxed. The chairman believes that it is imperative that the various states do not let this increased burden interfere with carrying out their earlier plans for greater utilization of the statistical material for which the 1940 census will provide accurate population figures.

Preliminary population counts have been released by the Bureau of the Census for counties and cities over 10,000 and for all states. A new series of releases is now coming out giving the final figures based on hand counts for each state, and these will be completed for the entire country within the next few weeks. More detailed statistics of the population by age, sex, etc., will not be available before the first of the year. These will be issued in a series of population bulletins for each state as rapidly as possible, but not all will be available until the summer of 1941.

The Vital Statistics Division of the Bureau of the Census is contemplating the issuance of several monographs, the plans of which are already being worked out. The following subjects are being considered: Cardiovascular-renal Diseases; Completeness of Birth Registration; Results and Problems of Residence Allocation of Births and Deaths,

1935-1940; Analysis of Birth and Death Rates; Urban-rural Differences in Mortality and Natality; Critique of Marriage and Divorce Statistics; Differentials in Judicial and Penal Treatment of Offenders; Distribution and Characters of Patients in Mental Institutions at the 1940 Census; A Statistical Critique of Medical Care in Institutions; Comparability of Mortality Statistics. It is expected that the Population Division will issue a very valuable monograph on population estimates by states and subdivisions.

Before the next meeting of the Association, population data from the 1940 census should be available in bulletin form. Many of the demographic studies that have been suggested will contribute most to our knowledge if the several states adopt more or less uniform methods of presentation. In this connection, it should be emphasized that resident data should be utilized wherever possible. In computation of death rates specific for age, standard age groups should be used, and for areas in which more than 10 per cent of the population is colored, such rates should be specific for race as well. It is believed one of the objectives for each state should be to present data for significant subdivisions of the state which as a rule cannot be presented by any federal agency. In order to secure the widest distribution and use of the material presented, it is suggested that a series of small bulletins that can be issued at frequent intervals will be more helpful than large and bulky reports which will take so much time to prepare and cannot be digested at one sitting. For example, every county health officer in the country would find very useful a small bulletin that gave the principal characteristics of the population of his county together with time series of important rates of natality and mortality. One or more charts or graphs would



help to make such bulletins attractive and easier to interpret.

Finally, notwithstanding the increased pressure which the needs for defense will make upon the facilities of registration offices, it is urged that we go forward with our original program for greater utilization of our vital statistics data. Fifteen years ago the chairman of your committee emphasized the importance of more complete analysis of our vital statistics.<sup>2</sup> He concluded this paper as follows: "The collection of vital statistics in the United States will be on a vastly sounder basis as a necessary part of health work when state registrars make adequate provision for analysis and interpretation of these data so that they are locally useful." At this time when the social needs for complete registration of births and deaths are becoming more fully realized, it is

important that we, as registrars, keep before us at all times that registration of births and deaths is a proper function for health departments because from the beginning such records have been essential in determining the causes and trend of ill health and mortality.

#### REFERENCES

1. Report of the Proceedings of the First National Conference of State Registration Officials, *Vital Statistics—Special Report*, Vol. 9, No. 65 (Sept. 27), 1940.

2. Fales, W. Thurber. *The Functions of a State Bureau of Vital Statistics*. *A.J.P.H.*, Mar., 1926.

W. THURBER FALES, *Chairman*

J. V. DEPORTE

FORREST E. LINDER

ALFRED J. LOTKA

HUGO MUENCH, JR.

RUTH R. PUFFER

GEORGE H. RAMSEY

JESSAMINE WHITNEY

## Sylvatic Plague\*

SINCE the members submitted no problems for consideration, the Executive Committee deemed it unnecessary to hold a meeting. With the exception of a human case of suspected bubonic plague near Scipio, Utah, in a WPA worker who ran a trap line for coyotes, and the demonstration of *Pasteurella pestis* in a Richardson ground squirrel at Stanmore, Alberta, Canada, 180 miles north of the International boundary and almost directly north of Shelby, Mont., little knowledge relative to the epidemiology of sylvatic plague has accrued.

A few infected rodents or fleas have again been found in the old foci of Contra Costa, El Dorado, San Benito, San Bernardino, and Ventura Counties of California. In 1940 the survey activities of the U. S. Public Health Service disclosed sylvatic plague in Grant, Lincoln, and Spokane Counties of Washington. The painstaking work of the state crews led to the finding of a diseased marmot in Lake County, an infected squirrel in Baker County, and fleas in Malheur County, Oregon. A species of *Citellus* (*variegatus* *Utah*) not previously known to be spontaneously infected with plague was found in Millard County, Utah. *Citellus beldingi oregonus* and *Citellus richardsoni nevadensis* have been proved infected with *Pasteurella pestis* in Elko County, Nev.

If one reviews with an open mind the enormous amount of work so faithfully carried out by the survey crews

of the western states and of the U. S. Public Health Service in locating sylvatic plague, and by the Biological Survey in suppressing the rodent population through expensive poisoning campaigns, one wonders if it is not imperative to review the present-day knowledge and to offer some suggestions relative to future procedures. For the benefit of the health officials of the western states it is deemed proper to present for due consideration and appraisal a statement recently prepared for the benefit of the Rosenberg Foundation.

"The story of the plague outbreak in the United States at the beginning of the century is as interesting as it is hard to believe. The existence of plague in California was strenuously denied by newspapers and politicians, in the face of careful investigations by trained bacteriologists. But it was possibly due to such a start that the work continued, even if slowly. Relatively early, as compared for example with investigations in South Africa, plague was found in wild rodents, and the existence of a possible reservoir in wild rodent populations was realized. But it is only in the last 6 years that the potential proportions of this reservoir have been understood, and even today there are extremely few facts in our picture of the situation.

"Certain excellent improvements in technics, as for example the use of pooled tissues and parasites in the location of plague foci, have made possible a rapid progress. At the same time certain ideas retained from the early days of plague work may prevent the investigation of more profitable lines of re-

---

\* Fifth Report of the Sylvatic Plague Committee of the Western Branch, American Public Health Association, presented at the Eleventh Annual Meeting in Denver, Colo., June 26, 1940.

search. A very strenuous effort should be made to keep ideas abreast of technics and to determine the validity or fallibility of each accepted 'truth.' Two old ideas that require such checking are:

"1. That plague organisms, brought into the ports of Los Angeles, San Francisco, and Seattle by infected rats or rat fleas, were transferred to the domestic and wild rodents of the vicinity.

"2. That investigations showing the existence of plague, 1,200 miles from such ports prove the spread of the disease from these original foci of infection.

"Outbreaks at the beginning of the century occurred in South America and South Africa as well as in California, and in each case these have been held responsible for the subsequent spread of the disease. But it should be sharply emphasized that, tenable though they may seem, these statements are only theory, and old theory at that. Indeed, an equally plausible theory could be formulated thus: that, although these port outbreaks may be associated with plague importations, plague organisms may well have existed in the country for a much greater length of time; and that their spread may have been accomplished a long time ago by slow infiltration and spread of rodent hosts, a process that may have lasted some hundreds of years and may still be going on at the present time.

*"But what are the facts about the plague problem at the present time?* First, plague exists in at least 10 of the 11 states of the Far West, as well as in Canada. It exists more than 1,200 miles from the Pacific Coast. At least 26 species of wild animals have been proved infected naturally with plague organisms. It is thus a fact that animals of various kinds represent a huge reservoir for plague (and there is much evidence to show that other diseases contracted by human beings have a similar reservoir). Human cases contracted through this reservoir have up

to this time been few in number. But it should be fairly obvious that it is impossible to rid the country of plague by eradication of this great natural reservoir. From the public health point of view, control measures and education of the general public furnish the alternative. It should also be obvious that the problem is a permanent one, requiring a constant 'police force' against such undercover methods of disease; an analogy with a 'racket' is by no means out of place!

"It will be some time before a definite statement can be made of the distribution of sylvatic plague. A casual glance at our present maps of distribution shows a considerable correlation with mountainous districts, but we are still far from a knowledge of any physiographic or climatic limiting factors. Nevertheless this is an important phase of the problem, since distribution will ultimately determine the methods of control.

"It is obvious that at some time or other plague must have spread to occupy its present wide distribution in this country. Possible methods of spread are now fairly well understood, but little is known of the rate of spread. The ecological relationships of the animals known to harbor plague organisms or plague-infected fleas are so many as to form a continuous and unending pathway of spread. The rate of spread depends upon the extent of migration and normal dispersal of both animal host and parasite vector populations. As yet little is known in this regard. Furthermore it will be seen that unless some definite knowledge is obtained of such population movements, little can be done to prevent further insidious spread. Any limiting factors in regard to any sort of activity by the various species involved may be of considerable importance, and field research should be encouraged to concentrate on these aspects.

"A personal opinion is that plague could easily have spread, by means of fleas, from one animal host species to another, without any great movement on the part of the hosts themselves. But to account for the relatively rapid spread that is supposed to have occurred here, actual large-scale migrations and invasion of new territory by the animal hosts would have been almost a prerequisite. None of the evidence collected so far suggests that such has been the case. But it is still to be cleared up.

"To emphasize further our state of ignorance, it may be said that we know little of the ecology and activity of fleas, which loom as the most important (but not the only) parasite vector. Subtle complexes of microclimatic factors and the problem of host specificity have hardly been explored superficially. But it is obvious that investigations of these problems can be best carried out in connection with the study of the animal hosts which to some extent create the conditions of life for the parasites.

"*What we still require to know* for a thorough understanding of the plague problem and for means of its control has been reflected in the above summary of our state of knowledge or lack of it. The absence of plague must be wondered at as much as its presence. For example, as yet no plague has been demonstrated in *Citellus beecheyi douglasi*; this squirrel has the greatest geographical range of any of the subspecies of *Citellus beecheyi* and is supposed to merge in certain regions with *Citellus beecheyi fisheri*, in which plague has been shown to exist. Another subspecies, *Citellus beecheyi beecheyi*, is also infected with plague in nature. If plague really is absent from *douglasi*, it is a most remarkable fact. Has a natural immunity been acquired? Or if not, what prevents the spread of plague? A study of this

problem might throw some very important light on the whole plague question.

"In outlining the trend of future work it may again be emphasized that eradication is impossible, but that constant efforts in control will be necessary. From an ecological standpoint, control will be most effective if based on natural laws of distribution and upon limiting factors. Since at least two dozen species of animals are involved, the situation is obviously complex, and can best be attacked by concentrating efforts upon one species at a time. At present the genus of *Citellus* appears to be the most important single group.

"Ecological lines of most importance may be summed up as follows:

"1. There is no evidence of large-scale migration among the naturally infected animals. There is little evidence of any extension of range in the various subspecies, although *Citellus beecheyi douglasi* has extended its range slightly in recent years. These may be regarded as abnormal movements and do not seem to have played much of a rôle in the spread of plague. Such movements as may occur should be studied carefully, since they are of a much greater magnitude than normal dispersal. Abnormal movements should be watched for.

"2. Normal dispersal is probably much more important. Work done at Bass Lake gives evidence of a relatively stationary population of *Citellus*, but on the other hand *Citellus* is known to travel several miles when food is scarce in the vicinity of the burrows. Normal dispersal appears to be a relatively slow process, but this is in fact one of the important things to be determined.

"3. What factors limit the normal dispersal? Presence or absence of enough food will be important. Young squirrels are known to stay close by

their burrows for some time after their first emergence. Search for mates may be of importance at certain seasons of the year in mixing up the population. Estivation or hibernation also limits activity. Determination of these factors will be necessary for adequate control measures.

"4. Evidence of population fluctuations and epidemic outbreaks of disease must also be collected. At present we have virtually no information in this regard. There is little evidence to indicate cyclic fluctuations among *Citellus*, although there do seem to be considerable ups and downs of the population.

"5. Relationship to other animals is a very important aspect of the whole problem. The proposed theory of general infiltration of plague is based upon the conception of a complex ecological structure of relationships, such as might exist where several species occupy the same burrow system.

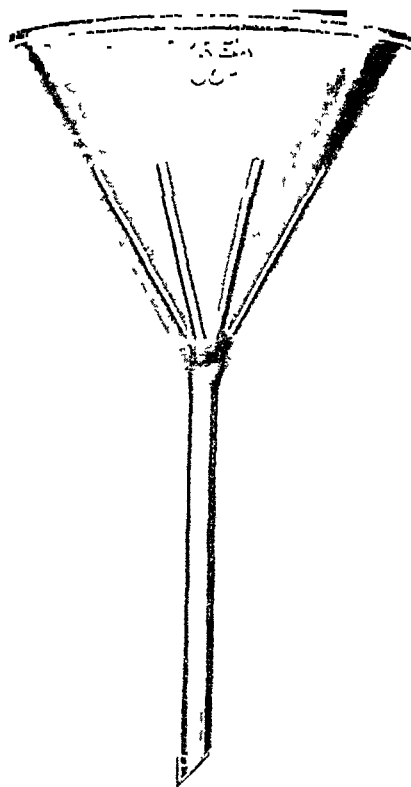
"6. Particular attention should be paid to host-parasite relationships. Work at Tahoe and Bass Lakes has demonstrated that hosts may rapidly acquire a fresh parasite fauna. It is likely that each flea comes in contact with at least several different hosts and that in this way there is considerable exchange. But definite information is scarce. An important gap is the relation of the nest fauna (of parasites) to the host fauna. This must sooner or later be determined.

"To sum up, work on any one species of animal should be continued for at least several years in the same place. Individuals should be marked for separate study, and there should be much more *observation* than there has been in the past. The key problem is activity and the factors limiting it."

The multitude of studies on plague throughout the world have paid little attention to the importance of ecological studies on the wild rodents. For the past two years a small group of mammalogists has been engaged in the collection of facts relative to the migrations of the common ground squirrel. Inquiries into the temperature and moisture conditions of burrows have been initiated. Another group has quietly reinvestigated the use of mice as suitable animals for flea transmission studies, while a third group is continuously engaged with the elucidation of certain intriguing factors relative to age and sex in the host-parasite relationship of squirrels to *Pasteurella pestis*. It is anticipated that these field and bench studies will furnish information which may be made the basis of a more detailed report and recommendations in 1941. For the present, the suppressive measures as employed in the past should be continued.

It is recommended that the committee with its present membership and duties be continued.

K. F. MEYER, *Chairman*



Remember that "pet" funnel you liked so well? You probably tried many before you found it. Maybe you still have it, or perhaps you've long been searching for another just as good. Search no longer. Now you can have any number of "pet" funnels without searching for them . . . use Pyrex brand accurate 60° fluted funnels.

They are precision-shaped, pressed to an accurate 60° angle which permits close fitting of filter paper, and the inside flutes double the effective filtering area. All these characteristics make for rapid filtering.

Made of Pyrex brand Chemical Glass—the Balanced Glass—every funnel is mechanically strong, chemically stable and, of course, thermally resistant. All are strong-

er, too, because of beaded edges and heavy wall stems. Furthermore, automatic moulding permits low prices.

Try the accurate 60° Pyrex brand fluted funnel and you'll agree that it is the "pet" of the funnel family. Consult your regular laboratory ware dealer.

*"PYREX" is a registered trade-mark and indicates manufacture by*  
**CORNING GLASS WORKS • CORNING, N. Y.**

**CORNING**  
*means*  
 Research in Glass

*Pyrex Laboratory Ware*  
 BRAND

# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

April, 1941

Number 4

## CONTENTS

	PAGE
Public Health Expands Its Facilities Under Title VI—Federal Social Security Act . . . . .	297
<i>E. R. Coffey, M.D.</i>	
Schistosome Dermatitis as a Bathing Place Problem . . . . .	305
<i>John E. Miller, C.E.</i>	
The Community Health Education Program: The Hartford Plan—Audio Visual Unit . . . . .	310
<i>Benjamin G. Horning, M.D., Lucy S. Morgan, Ph.D., Beatrice Hall Kneeland, and Alice H. Hammar</i>	
Public Health Applications of High-Speed Photography . . . . .	319
<i>Clair E. Turner, Dr.P.H., Sc.D., Marshall W. Jennison, Ph.D., and Harold E. Edgerton, Sc.D.</i>	
Value of Bacteriophage Determinations as a Supplemental Procedure in the Diagnosis of Bacillary Dysentery . . . . .	325
<i>K. M. Wheeler, Ph.D., and A. L. Burgdorf, M.D.</i>	

*Continued on page vi*

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear. These are not to be regarded as expressing the views of the American Public Health Association unless formally adopted by vote of the Association.

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Reader's Guide in your Library.

Published by the American Public Health Association at 374 Broadway, Albany, N. Y.  
Executive Office, 1790 Broadway at 58th St., New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States, Cuba and Mexico, South and Central America; \$5.50 for Canada; and \$6.00 for other countries. Single copies 50 cents postpaid. Copyright, 1941, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor, H. S. Mustard, M.D., 600 W. 168th Street, New York, N. Y.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 1790 Broadway at 58th St., New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.

# NO PLACE FOR SNAP JUDGMENT

When a dairy submits a new hood or cover cap to the local health officials for their consideration, a lot of questions must be answered. Such as:

*How well has it worked in other cities?*

*Does it provide sufficient protection?*

*How does it perform in cold weather?*

*Will it withstand icing of cases?*

*How is it made and how is it applied?*

*What about identification markings?*

*Is it convenient for consumer to use?*

Type A Alseco Aluminum Hood on Econopour Finish bottle is both a secure seal and sanitary cover. Paper disc may be used if desired.



Type E Alseco Aluminum Hood may be used alone as both a seal and a cover, or may be used over a paper disc.



The answers to these and other questions can't be learned by simply looking at the hood. Nor from hearsay. Each point should be carefully investigated.

All the facts about Alseco Aluminum Hoods are readily available to you and you can check them with health authorities in other communities, 1,500 of them, where these hoods are used. Get these facts and a list of check cities. Write Aluminum Seal Company, 1359 Third Avenue, New Kensington, Pa.

## DEFENSE COMES FIRST

The urgent requirements of National Defense have somewhat limited the amount of Aluminum available to us for new business. However, Aluminum production capacity is being rapidly expanded. When the emergency is past, there will be more Aluminum available for hoods than ever before.

Trade Mark Reg.



U. S. Pat. Off

*Alseco*  
ALUMINUM HOODS



Rôle of Rats in the Spread of Food Poisoning Bacteria of the Salmonella Group . . . . .	332
<i>Henry Welch, Ph.D., M. Ostrolenk, and M. T. Bartram, Ph.D.</i>	
A Comparative Study of Standard Agars for Determining Bacterial Counts in Water . . . . .	341
<i>W. L. Mallmann, Ph.D., and Robert S. Breed, Ph.D.</i>	
Clinical Manifestations of Ariboflavinosis . . . . .	344
<i>V. P. Sydenstricker, M.D.</i>	
Determination and Characterization of Coliform Bacteria from Chlorinated Waters . . . . .	351
<i>Max Levine, Ph.D.</i>	
Comparison of Methods for Sampling Lead Fume . . . . .	359
<i>Lewis B. Case</i>	
Comparative Efficiency of Plating Media for the Isolation of Shigella Dysenteriae . . . . .	363
<i>Catherine R. Mayfield and Maud Gober</i>	
EDITORIALS:	
Is There a Doctor in the Bill? . . . . .	369
Minimum Functions and Organization Principles for Health Activities	370
Coccidioidomycosis . . . . .	371
Credit Lines: A Selective Digest of Diversified Health Interests— <i>D. B. Armstrong, M.D., and John Lentz, M.S.</i> . . . . .	373
This Thing Called Jargon. Best Sellers. Magazine Articles. Exhibit Encyclopedia Health Is News. Copy Commandments. Lectures for Laymen. Miscellaneous Health Notes. Notes on Notable Publications.	

*Continued on page viii*

*Reprint prices furnished upon request*

# NATIONAL



## RHUS TOX ANTIGEN

*Specific treatment and desensitization for Poison Ivy!*

**Prompt Action:** The Antigen, being a hydro-alcoholic solution is quickly absorbed. Relief is usually obtained within 24 to 48 hours after the first injection.

**Rhus Tox Antigen is Oil Free,** which minimizes the possibility of pain due to nodule formation or tumefaction.

**Economical:** Rubber sealed ampul-vials permit withdrawal of desired dose for each patient without waste.

PRODUCT OF MULFORD COLLOID LABORATORIES  
Distributed by

# THE NATIONAL DRUG COMPANY

PHILADELPHIA, U.S.A.

*Contents—Continued*

	PAGE
Books and Reports . . . . .	379
Books of Special Interest to Public Health Workers— <i>Mazjck P. Ravenel, M.D.</i>	
Man's Greatest Victory Over Tuberculosis. The March of Medicine. Number IV of the New York Academy of Medicine Lectures to the Laity. Hygiene: A Textbook for College Students on Physical and Mental Health from Personal and Public Aspects (3rd ed.). Plague on Us. Food Values of Portions Commonly Used (3rd ed. rev.). Photodynamic Action and Diseases Caused by Light. Legal Guide for American Hospitals. An Introduction to the Microbiology of Water and Sewage for Engineering Students. Biological Stains (4th ed.). Introduction to Parasitology: With Special Reference to the Parasites of Man (6th ed. rev.). A Surgeon Explains to the Layman. Penny Marsh Finds Adventure—In Public Health Nursing. Preventive Medicine (6th ed.). A Surgeon's Life—The Autobiography of J. M. T. Finney. Youth Looks at Cancer. Attaining Womanhood. A Guide to Human Parasitology for Medical Practitioners (4th ed.). In a Minor Key: Negro Youth in Story and Fact. Sex in Development. Emotional Hygiene: The Art of Understanding (2nd ed. rev.). Community Hygiene. Child Psychology for Professional Workers. The Doctor and the Difficult Child. Safe and Healthy Living. As the Twig Is Bent. The Girl Today—The Woman Tomorrow (rev. ed.).	
Books Received . . . . .	401
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . . .	402
Association News . . . . .	405
Seventieth Annual Meeting, October 14–17, 1941. Applicants for Membership.	
Employment Service . . . . .	407
News from the Field . . . . .	410
Conferences and Dates . . . . .	418

## INDEX TO ADVERTISERS

	Page		Page
A. P. H. A. . . . .	X	General Laboratories Division, Pennsylvania Salt Manufacturing Company . . .	XXXIX
Book Service . . . . .	XI, XII, XVI, XXVIII, XXXIV	Gilliland Laboratories, Inc., The . . . . .	II
Membership Application Forms . . . . .	XXXII, XXXIX	Harvard University Press . . . . .	XV
Affiliated Societies and A.P.H.A. Branches . . . . .	XXXII	Johnson & Johnson . . . . .	IX
Aluminum Seal Company . . . . .	V	Lea & Febiger, Publishers . . . . .	XVII
American Can Company . . . . .	LXI	Lippincott, J. B., Company . . . . .	XVIII
American Meat Institute . . . . .	XXXV	Macmillan Company, The . . . . .	XX
American Social Hygiene Association . . . . .	XIII	McGraw-Hill Book Company, Inc. . . . .	XX
American Society for the Control of Cancer . . . . .	XXXVI	National Drug Company, The . . . . .	VII
Canadian Public Health Association . . . . .	XXIX	National Organization for Public Health Nursing (N.O.P.H.N.) . . . . .	XXXVIII
Cancer, American Society for the Control of . . . . .	XXXVI	Oxford University Press . . . . .	XXI
Corning Glass Works . . . . .	III	Pennsylvania Salt Manufacturing Company . . .	XXXIX
Difco Laboratories, Inc. . . . .	Back Cover	Pyrex Brand Laboratory Ware . . . . .	III
Directory of Health Service . . . . .	XL	Reilly, Peter, Company . . . . .	XXIX
Bendiner & Schlesinger Laboratories . . . . .		Reinhold Publishing Corporation, The . . .	XXII
Black & Veatch . . . . .		Sewage Works Journal . . . . .	XXXVIII
Book Service, A.P.H.A. . . . .		Thomas, Charles C., Publisher . . . . .	XIII
Committee on Administrative Practice, A.P.H.A. . . . .		Trained Nurse, The . . . . .	XL
Dixie-Vortex Company . . . . .	XXXIII	University of Chicago Press, The . . . . .	XXIV
Dutton, E. P., & Co., Inc. . . . .	XIV	University of Minnesota Press . . . . .	XXV
Eimer & Amend . . . . .	XXXVII	Wallace & Tiernan Co., Inc. . . . .	XXX
Fisher Scientific Company . . . . .	XXXVII	Williams & Wilkins Company, The (including William Wood Books) . . . . .	XXVI, XXVII
Florida Citrus Commission . . . . .	XXXVII	Womans Press, The . . . . .	XXIX
Foot Hygiene Publishers . . . . .	XXIX		

# American Journal of Public Health

## and THE NATION'S HEALTH

---

Volume 31

April, 1941

Number 4

## Public Health Expands Its Facilities Under Title VI Federal Social Security Act\*

E. R. COFFEY, M.D., F.A.P.H.A.

*Surgeon, Division of Domestic Quarantine, U. S. Public Health Service,  
Washington, D. C.*

IN 1935 the words social and security were united in a partnership that was destined to become famous when Congress passed the Social Security Act. Though the title of this Act was publicized as representing a brand new development in human affairs, in reality there is nothing new about social security,—whether as an urge, as an ideal to be fought for, or as a concept for legislation.

Neither is the device of grants-in-aid new, by which our Social Security Act of 1935 functions, though some would have you believe that such grants sprang full-bodied from the brows of social security legislators in that year. Grants-in-aid have been in use as a recognized governmental device for a long time in our country and in other countries. In telling the story of their application by the United States Government, one might begin with the First

Morrill Act of 1862 which was enacted to help those states and territories maintaining colleges for the benefit of agriculture and the mechanic arts. As time went on, a considerable number of other measures were passed to assist the states in one project or another. It is impossible to choose between them in offering worthy precedents to the use of grants-in-aid in public health, but I might mention the Smith-Hughes Act (1917) to assist in vocational education, the Fess-Kenyon Act (1920) to provide for vocational rehabilitation, or the so-called Oregon-California Land Grant (1916) which touched upon such diverse items as common schools, roads, highways, bridges, and port districts. All these grants—whether of 1862 or of 1935—are fundamentally similar in operation. The states must show approvable projects and the responsible federal agency must approve them.

The Public Health Service has been employing this device in carrying on its activities with the states quite regu-

---

\* Read before the Health Officers Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

larly since 1917. In that year the Congress granted the Service \$25,000 to spend in coöperating with the states on studies and demonstrations in rural health work. This relatively modest appropriation marked the beginning of our new age in public health—an age in which the federal government would work actively and creatively with the states in studying the health of the people and in carrying on programs to meet their problems. We are all proud to look back and observe the public health movement to which it is our privilege to belong, entering at this time upon a period of courageous and enlightened expansion. It defied an ancient taboo and began intensive work to control the venereal diseases. It declared that the death rate among mothers and infants was unnecessary and must be and would be reduced.

In 1935 came the federal Social Security Act with Titles V and VI constituting a public health section. They were designed to give an added—and a needed—impetus to programs already under way and to fill some of the gaps in public health activities with new programs. Title VI, which is the particular responsibility of the Public Health Service, was written “for the purpose of assisting States, counties, health districts, and other political subdivisions of the States in establishing and maintaining adequate public health services, including the training of personnel for State and local health work . . .”

We are now in the fiscal year 1941 and the public health movement has received over four years of assistance under Title VI. Funds from this title have been administered in each state to the end that public health organizations and activities might be vitalized and made more serviceable. That end has, to a great degree, been realized. There are more state-wide programs of public health in operation today than there

were in 1935 when the Social Security Act was passed. New programs against particular diseases are being carried on now. More counties than in 1935 are today under the jurisdiction of whole-time health departments. There has been a stepping-up in the training and qualifications of health officers, nurses, and sanitarians—those who actually put public health into execution. For my part in today's program, I should like to highlight for you certain of these advances and to indicate the impetus given by Title VI in so far as numbers and percentages will allow one to reveal anything so intangible and far-reaching as an impetus.

These remarks must necessarily be limited to highlighting, for the subject just does not lend itself to condensation. To give you a detailed accounting of the programs alone which have fanned out through the use of Title VI funds would take hours rather than minutes. It would need to be done state by state, since not all programs are applicable to every region or every political division. I shall mention only in passing therefore the assistance given under Title VI to the problems of particular areas—such problems as malaria, trachoma, or rodent plague—and then go on to activities which are national in scope.

It might interest you to know with respect to the nation's programs of public health, including the special ones just referred to, that the funds budgeted from all sources by the states and territories for coöperative health work during the fiscal year 1940 amounted to over \$83,800,000, and that Title VI contributed over \$10,800,000 to this total, or nearly 13 per cent.

Part of this contribution has been directed to bolstering, encouraging, or otherwise assisting those activities which might be called public health staples. Sanitary engineering, which is fundamental to good public health whether in

the metropolis of a million souls or the crossroads community of five families; vital statistics, the index to the nation's annals of sickness and death; communicable disease control, one of the earliest forms of public health work; laboratories, the workshop for communicable disease control; public health education, which is a comparative newcomer but firmly rooted as fundamental to the aims of the new public health.

The propriety of using Title VI funds to invigorate established activities and *to meet problems long recognized as belonging to public health* is too obvious to need argument. But Title VI did not stop at maintaining the old and the well tried. By the very name of the Act of which it is a part, it is committed to more than that. Social security, whether of health or of something else, does not just happen. It is achieved through a combination of farsightedness, work, and faith. Title VI, as a public health division of the Social Security Act, must encourage the recognition of problems and the attempting of new tasks. I might add that the state administrators of public health have never been at a loss as to what to do next. There are so many health problems in this country that the administrators have been concerned rather with how to spread the money to take in all that was waiting to be done.

In order not to burden you with too great an assortment of figures, I am offering as evidence of expansion through Title VI assistance, a few contrasts between activities in 1935, the year which marked the beginning of the federal Social Security Act, and in 1940. In some of these heretofore untried tasks the contrast is very sharp indeed.

Pneumonia knows no sectional lines and observes no interstate quarantine. It is equally at home in the tenement or the ten room apartment. To defeat it costs money, and its depredations

therefore are greatest among the financially defenseless.

In 1935 none of our states was carrying on an organized state-wide program of pneumonia control. Families dealt with the disease as a purely personal problem. They called the doctor. If the doctor called the health department, it was generally to report the disease and not to ask for laboratory or other assistance. Today 34 states have programs of pneumonia control. Budgets for 1940 amount to nearly \$660,000, and 63 per cent of this represents Title VI assistance.

I would like to refer briefly to the pneumonia control program of one of our large industrial states as an example of the change in thinking that has gone on in public health and of the adoption of services that may be the direct means of saving lives.

This state, Pennsylvania, in a foreword to its program says that these activities have been undertaken to assist private physicians in giving more adequate care to pneumonia sufferers and to reduce thereby the death rate from this disease. You see the difference in thinking in that statement. To reduce the death rate is an old aim of public health. But to assist the physician directly in saving the life of his patient is a new undertaking.

It is no mere moral support that the program offers the physician and through him the patient. This state has 175 pneumonia control stations distributed throughout its territory, and these stations offer the diagnostic laboratory facilities which are so necessary in today's pneumonia control. Through these stations sulfapyridine and serum are distributed free for any pneumonia patients who are financially restricted.

Approximately 8,500 cases of pneumonia were treated during the past season under Pennsylvania's program, and possibly 15,000 patients will be treated in the year to come.

Here is a new program of which any state might be proud. And the 34 new programs in existence as compared with none in 1935 represent a splendid advance in public health.

Cancer is another disease which presents a major problem to us. You might consider public health as particularly responsible, since its activities in prolonging human life have helped to produce a population among whom cancer ranks as a leading disease. Only in recent years, however, has the problem been considered a public health responsibility, and only since the advent of Title VI has there been any pronounced trend toward programs of cancer control.

In 1935, 3 states had cancer control programs. Under the impetus of Title VI funds the number has increased to 16. The amounts budgeted from federal, state, and local sources for these programs run somewhat over \$600,000 in 1940—an increase of 100 per cent over the 1935 budgets. Title VI funds are responsible for half of this increase.

State programs of cancer control are set up to include the prevention of cancer through education, state aid in treating the indigent, free tissue diagnosis for physicians, the postgraduate education of physicians, and compilation of vital statistics.

Although we are encouraged by the upward trend in these state programs, they have not as yet gone far enough to warrant a stop for congratulations. The lack of treatment facilities for those who need care is still too great. The education of the public in the ways of cancer has been going on faster than has the provision of facilities for treatment. "Find out the truth while the truth will avail you," has been the theme of that education. But treatment must be provided or the truth will still not avail.

A less spectacular but nonetheless substantial increase has been shown by

programs of dental hygiene since the advent of Title VI. Our first state-wide program of dental hygiene was set up by North Carolina in 1918. Other states gradually followed until, in 1935, there were 15 carrying on this work. Title VI funds have been allocated for these activities and have helped to bring the total number of states with such programs up to 38. That is to say, between 1935 and 1940, 23 states added programs of dental hygiene.

These programs may be described briefly as consisting of education and service; the education intended for all groups and the services for those who are dentally indigent. The chief objective of a state-wide program is the development of local health department programs for carrying on such education and service.

Amounts budgeted for state-wide programs went from about \$100,000 in 1935 to nearly \$475,000 in 1940. This is a percentage increase of major proportions of which Title VI is responsible for about 22 per cent. The total federal share in this increase is rather higher, for the Children's Bureau also has a financial interest in these programs.

Finally, I should like to mention the expansion in programs of industrial hygiene. This activity has had an interesting and rapid rise since 1935. Concern over the accidents and illnesses occurring among employees is, of course, as old as labor itself and has arisen from both humanitarian and economic thinking. And certainly some efforts have always been going on to soften the effects of sickness among workers. The Squire's lady paying her sick calls upon the cottagers is a traditional figure, and she has had her counterpart in every land. Many employers even in the dark ages of the industrial era were alert to improve working conditions for their employees. Many of them continued to carry on their payrolls workers who were sick or

otherwise disabled. Employees themselves often took the initiative, and from their efforts came the sick benefit associations with which we are all familiar.

All these attempts to prevent illness and accidents and to mitigate their effects remained sporadic and uneven compared to the continuousness and evenness of the total problem. As the industrial age proceeded, its more enlightened folk perceived in sickness and time lost factors that must be dealt with in the same thorough fashion that raw materials were bought and markets sought out. The growing body of information on occupational diseases stimulated this enlightenment. Eventually the thinking and the efforts developed into the theory and practice of industrial hygiene. This subject rests upon the sound premise that the time lost from all types of disability is important to the worker, to the business in which he holds a job, and to the community of which he and his household form a part.

In 1935 three states had programs of industrial hygiene, and in the succeeding years 28 more have added them, so that today 31 states are carrying on this work. Industrial hygiene programs are worked out through labor agencies, physicians, and industry itself. An important feature of these programs is the direct study of working environments. Budgets for industrial hygiene went from \$23,000 in 1935 to more than \$500,000 in 1940, a 20-fold increase. The states which carried on these programs in 1935 had a working population of some 12 million. In 1940 states conducting industrial hygiene activities have a working population of 40 million.

Title VI has been decidedly a leader for the public health movement in this field of endeavor. Over 80 per cent of the expansion in budgets has come through the use of Title VI funds.

I hope that the details I have chosen have given you a clear outline of the pattern of Title VI distribution—the assistance in meeting localized health problems, the impetus given to old, established state-wide public health programs, and the development of many new programs to combat some of our great illness problems.

I should like next to turn to another aspect of Title VI assistance and show how this provision of the Social Security Act has been used to strengthen the mechanism of public health. Mechanism is a severely impersonal word to incorporate such vital personal elements as health officers, nurses, and sanitarians, but it is a good compact word to signify the structure of public health, the health departments and their workers.

The local health departments which function down where the problems grow are the basic units of public health in this country, and they are rather varied units in point of organization. Some of them might be described, with malice toward none, as rudimentary, since they consist of part-time personnel uneducated in public health and frequently quite naive about its complex processes. Above these are the health departments which technically conform to definition in that they are manned by qualified public health personnel, but which are obliged to run under so limited a budget that their programs are only skeletons of what they should be. And so on up the line to those relatively fortunate departments with budgets that provide facilities almost adequate to cope with the problems of the community.

Title VI funds have been put to excellent use by the states in building up and strengthening local health organizations. Over-all evidence of what has been accomplished since the Social Security Act came into existence may be found in the 1,577 counties now under full-time health departments as against the 762 counties in 1935.



TABLE 1  
Growth in Full-time Local Health Units\*  
1935-1940

	Number of Units		Increase	
	1935	1940	No.	Per cent
Single County Units	486	655	169	34.8
Local District Units	41	122	81	197.6
State Supervised Districts	34	106	72	211.8
Total	561	883	322	57.4
	No. of Counties Covered		Increase	
	1935	1940	No.	Per cent
Single County Units	486	655	169	34.8
Local District Units	124	356	232	187.1
State Supervised Districts	152	566	414	272.4
Total	762	1,577	815	107.0

\* Based upon budgets submitted by the states to the U. S. Public Health Service

According to the budgets submitted by the states to the Public Health Service, the amounts budgeted for local health services from federal, state, and local sources have gone from around \$7,500,000 in 1935 to over \$17,000,000 in 1940. This represents an increase in moneys available for local health services of around 129 per cent. About 40 per cent of this expansion in budgets may be traced to Title VI funds.

These 815 more counties with full-time health services offer an encouraging picture to public health administrators, especially to those who have been following the growth of county health departments since their beginnings in 1911.

I suspect, however, that some of you might wish to ask whether this increase means that there are 815 more county health departments than there were in 1935. The answer is, no; and that brings us to the trend in types of local health organization.

The number of single county health departments has gone from 486 to 655 in this time, an increase of nearly 169, or 35 per cent. This represents, however, only a small portion of the ex-

pansion. It would seem that the single county unit is giving way to the plural form in which two or more counties combine their resources to organize a health department. This type of unit increased from 41 in 1935 to 122 in 1940. Each of these covers two or more counties, and the increase in counties covered therefore runs quite high—from 124 to 356, or approximately 188 per cent.

But the really significant trend during these few years in the expansion of full-time health service has been the growth of the so-called state supervised districts. The form of these districts varies somewhat. There are some that seem to be a decentralization of the state health departments. Others, to all outward appearances, are essentially local health departments. The common characteristic uniting all these state-supervised districts is that the costs are borne by funds independent of local contributions. Since 1935 the number of these districts has risen from 34 to 106 with an increase in counties covered from 152 to 566, or approximately 272 per cent. Another factor of the expansion in public health services is the marked

improvement in the quality of personnel. Quality is indispensable in carrying health to the public whether as a subject or a service. Much of our health work depends for its effectiveness upon the ability of the medical officer, the public health nurse, and the sanitation worker to deal in an intelligent and professional way with the public. Our national legislators recognized this and also that an expanding public health program would demand additional well trained personnel. They therefore wrote into the purpose of Title VI the phrase I have already quoted "including the training of personnel for state and local health work."

employees. The proportion of nurses among the trainees is greater than their proportion among public health personnel as a whole, while the converse is true of sanitation workers.

This discrepancy indicates that some thought could very profitably be given to relative balance when selecting personnel for training since these professional groups are all highly important to public health work. It is obvious that a sound training program should extend about the same proportion of opportunities for advanced training to one group that it does to another. Table 2 does show, in fact, that the proportion of nurse trainees

TABLE 2  
*Distribution of Trainees by Year and by Professional Class*  
1936-1940

Year	Total	Professional Class							
		Physicians		Nurses		Sanitary Personnel		Others	
		No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
1936	513	20	3.9	471	91.8	19	3.7	3	0.6
1937	774	58	7.5	648	83.7	57	7.4	11	1.4
1938	1,869	310	16.6	1,186	63.4	265	14.2	108	5.8
1939	928	226	24.3	503	54.2	123	13.3	76	8.2
1940	1,094	285	26.1	626	57.2	107	9.8	76	6.9
Unknown	241	68	28.2	105	43.6	55	22.8	13	5.4
All years	5,419	967	17.8	3,539	65.3	626	11.6	287	5.3

Since 1936 the state and territorial health departments have authorized the training of 5,419 trainees, 80 per cent of whom had their expenses defrayed, in whole or in part, out of Title VI funds. Nurses made up 3,539 of this number, medical officers 967, and sanitation personnel 626. The remaining 287 were individuals in the various other classifications. The distribution by professional class does not exactly correspond to the distribution by professional class of public health workers at large, as estimated by a study\* of public health

has gone down, but this decrease has been more than balanced by the increase in medical trainees, with the result that the small proportion of sanitation personnel trained has shrunk still further.

In the beginning, the state health officers had the task of getting a hurried program under way to meet the immediate demand for trained personnel brought about by the expanding health program. There are, of course, exceptions to most generalizations, but I think it is safe to say that a person without the proper preliminary education and practical experience will take on advanced public health training only as a sort of superstructure. It will

\* Derryberry, Mayhew. Educational Qualifications of Staff Members in Health Departments. *A.J.P.H.*, 30, 6:645 (June), 1940.

add to his knowledge, of course, but he will have difficulty in turning it to practical account. In this respect a tremendous amount of credit must be given to state health officers for exercising a stricter choice each year in the selection of trainees on the point of basic education and experience.

This more careful selection of trainees has become increasingly evident from year to year. In 1937 there were quite a number of nurses and an even greater number of sanitation trainees who reported that they had not finished high school. In 1940, however, practically all trainees in both these groups claimed high school graduation. As to post-high school training, it can be assumed that all medical officers and nurses have been graduated from their respective professional schools. In 1937, however, a large proportion of the sanitation trainees had never attended college, while in 1940, three out of every four of the sanitation trainees selected claimed a college degree. Thus, it may be said that as a whole the trainees selected by

state health officers now are basically well trained and are in a position to capitalize on advanced public health training. I am sure that you will all agree on the propriety of this trend, since advanced public health training should be a process of making a specialist of one who is already a professional. Eventually it will be just that. On the basis of present trends, we may judge that in a very short time all trainees will be graduates of professional schools.

This concludes my report of the several years of endeavor under Title VI, the public health section of the Social Security Act. I hope it merits your approval that Title VI has been used to promote established activities and to lead public health into new paths toward more ambitious objectives. The fact that it operates through the use of grants-in-aid means that much material assistance can be given to the states and through them to their subdivisions without detracting from the responsibility, the judgment, or the authority of the local people.

# Schistosome Dermatitis as a Bathing Place Problem\*

JOHN E. MILLER, C. E.

*Assistant Engineer, Michigan Department of Health, Lansing, Mich.*

SCHISTOSOME dermatitis or swimmer's itch, as it is commonly called, is a parasitic infection which indirectly may be considered as a public health problem. The dermatitis is of a type that will not spread from person to person, and fortunately it differs from bacterial infections in that it is not contagious. There is, however, a problem when one considers it from the angle of secondary infections; particularly so when serious cases have been irritated to the extent of producing open lesions.

The purpose of this discussion of swimmer's itch is to give, in a general way, the cause, the distribution, the conditions favoring it in Michigan, the history of that state's activities with relation to it, and the problem.

## THE CAUSE

Water itch is caused by the penetration of the larvae of certain species of parasitic worms called schistosomes through the skin of man. The life cycles of some types of schistosomes are known and it can be deduced that the closely related schistosomes causing water itch probably have the same general type of life cycle. A brief outline of this cycle will illustrate the various stages of development of the schistosome causing

swimmer's itch. The adult worms apparently live in the abdominal veins of muskrats, mice, gulls, terns, ducks, grebes, and possibly other water birds. The eggs produced by the female worm break through the intestinal wall of their warm blooded host and are voided with the feces, generally into water. The embryo which hatches from the egg swims about and if it encounters a snail of the right kind and age it actively penetrates into its liver. The embryo grows into a long sac-like structure which produces within its body a brood of individuals resembling itself. These emerge from the parent sac but remain in the snail. The members of this generation, over a period of 4 to 6 weeks, produce a large brood of young parasites of quite different nature. This generation are the Cercariae which cause swimmer's itch. These larvae are provided with a forked tail for swimming in water and also a special penetration organ with special glands for use in working a way out of the parent and out of the snail into the water. Finally, after a short period of swimming in the water, the Cercariae by means of these penetration organs actively bore through the skin of any warm blooded animal with which they come in contact. If this animal happens to be the normal host the parasites complete their life cycle.

\* Read before the Engineering Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

Man is an abnormal host to these free swimming parasites, but the *Cercariae* are unable to differentiate between the various warm blooded animals. If they come in contact with the skin of man they will penetrate and attempt to establish themselves. They find themselves, however, in an unsuitable place and die.

They do not penetrate far beyond the skin of man but their presence immediately under the skin produces an irritating, itching sensation. The itching becomes intense but is seldom more serious than that produced by chiggers and usually subsides in 4 to 7 days. Man is not the only sufferer because infections of dogs and horses have been observed also.

#### DISTRIBUTION

After the cause of water itch became known, reports from various parts of the world indicated that the nuisance was not confined to Michigan. In the past 10 years it has been reported from 11 states in the United States, several Canadian provinces, England, and various parts of Europe. On this continent most of the trouble is encountered in the northern midwestern states and the central provinces of Canada. Recent surveys show that Michigan has a generous sprinkling of infested areas. Interviews with "oldtimers" also indicate that it is not a new thing in the history of the state but that it was known as a weed itch at least as far back as the lumbering days. The widespread knowledge of the cause of water itch during the past few years and the increased use of Michigan as a summer resort area has resulted in a marked increase in the number of reported cases and the areas affected.

#### THE PROBLEM IN MICHIGAN

Michigan, with its great number of beautiful lakes of all sizes in all sections of the state, provides ideal facilities to

tourists and users of resorts. These lakes in the northern part of the state usually contain exceptionally clear and clean water, and along a large proportion of their shore lines there are protected sand beaches and shallow water over sandy bottoms. With such facilities, these lakes make ideal swimming places. Unfortunately these same swimming places are the locations at which snails of various species make their home and thrive in large numbers from year to year. The species of snails that produce the *Cercariae* causing swimmer's itch are superior in numbers at these beaches.

It appears that one outstanding factor in this problem is bird migration at various seasons. The continued development of lakes in northern Michigan as wild life refuges has increased and will continue to increase the wild bird population which, following the usual migratory habits of birds, will result in more infected snails and beaches. Also, increasing the percentage of infected snails will bring about an increase in the number of cases of itch as well as in the intensity of infections.

Weather is another factor which plays an interesting part in the series of events. The northern part of Michigan generally has mild and relatively cool weather until the latter part of June or the first part of July. During the following four to six weeks or longer, the hot summer weather and the bright sunny days produce an ideal water temperature for swimming and this brings the beaches into use. It is at this same time unfortunately that the *Cercariae* in the snails develop into free swimming larvae and emerge to do their damage.

#### HISTORY OF THE STATE'S ACTIVITIES

For a number of years prior to the summer of 1938, the Michigan Department of Health received numerous complaints each summer about a water itch at bathing places. These were generally

answered by stating what caused the itch and that such areas of any lake so infected should be avoided. In the summer of 1938 complaints were numerous, and in view of the growing seriousness of this problem an investigation of several seriously affected lakes and beaches was made. Information was secured about the itch and what had been or could be done to control it. Following this investigation several beaches were treated with some success.

During the spring prior to the 1939 summer season, the several interested state departments decided that one of them should take some active steps toward a systematic investigation of all complaints, study the problem, and devise means of employing a simple, cheap, and satisfactory method of eliminating or controlling schistosome dermatitis. The Michigan Stream Con-

trol Commission was allocated funds for such a program. At the beginning of the 1939 season, that Commission organized a field party consisting of a biologist who was in charge of the party, a chemical engineer, a member of the Institute for Fisheries Research, an assistant sanitary engineer, and two field assistants. This party was equipped with a mobile laboratory, transportation with a house trailer, a powered boat and trailer, necessary chemicals for research and control, and other minor equipment deemed necessary for such an undertaking.

The three months of summer activities of this party yielded some valuable and useful information. A number of beaches were also successfully treated. Generally following complaints, 139 beaches in the upper peninsula and the northern half of the Lower Peninsula



*Swimmer's Itch*

were thoroughly examined. Reports of dermatitis came from some 20 other beaches, but lack of time prevented the party checking on them. Of the 139 beaches visited, 58 were found infested with schistosomes, leaving 81 that apparently were not troubled with them during that summer. Of the 58 beaches found to be infested, 25 were given some type of treatment in an attempt to kill the snails. This left 33 beaches known to have been infested or reported as such that were not treated. The investigations indicated that the intensity of the infestation varies with each season and that the 1939 summer was one of moderate infestation if based on past University of Michigan Biological Station observations.

At those beaches which were treated, chemicals were used in different concentrations, applied in several ways, and tried under variable conditions. The hand sowing of pea-coal-size crystals of copper sulfate gave fair results in some areas. Finely powdered copper carbonate was reasonably effective but was difficult to handle. Dissolving copper sulfate "snow" in a large drum of water and then pumping this solution out through a T-shaped pipe that was pulled along the bottom proved to be ineffective. A mixture of copper sulfate "snow" and copper carbonate powder in water gave better results than either one of the copper compounds alone. Copper stamp sand appeared to be effective only after it had a chance to act on the snails over a long period of time.

The conclusion from this work was that the most effective means of control involved the use of a mixture of copper sulfate and copper carbonate in the following manner: After a beach had been examined for the location of snail beds, the extent of the area to be treated was decided upon. For example, if the beach and adjacent areas to be treated were 800 ft. long and the snails were found

200 ft. from shore, the total area of 160,000 sq. ft. would be marked with stakes. The average beach should receive 2 lb. of copper sulfate and 1 lb. of copper carbonate per 1,000 sq. ft. Therefore, in this case 320 lb. of copper sulfate and 160 lb. of copper carbonate would be needed. During the summer of 1939 these quantities could be purchased for about \$50. A practical method of treatment in the field consisted of making a solution of the two chemicals in the proper ratio in a 60 gal. barrel in a boat and siphoning the mixture out of the barrel through two lengths of garden hose, one on each side of the boat, with the ends dragging on the bottom. A 60 gal. mixture consisting of 50 lb. of copper sulfate and 25 lb. of copper carbonate should treat 25,000 sq. ft. This method of treatment was found to be very effective, provided the application was carried out on a calm day and even distribution of the strong chemicals over the bottom thereby secured. No control treatments should be made before the latter part of June because of the possible deleterious effect on fish, particularly spawn. Otherwise, no damage to fish was detected.

During the 1940 summer season, the Michigan Stream Control Commission supplied those interested in this problem with a pamphlet on water itch, and later, if requested and needed, investigations were made and technical assistance given. For field work, the party consisted of two biologists and one assistant sanitary engineer, all of whom had had previous experience with control of this problem in affected areas, and were familiar with the research program designed to bring to light simpler and less expensive control methods. Studies during this summer revealed it to be the worst season on record.

Areas previously not reported or known about were found to be heavily infected. Some areas which had been

treated and a reduction in snail population secured, were again found to be infected to the point of being a nuisance. The cause of this, however, was the high percentage of infection of the few remaining snails or from Cercariae migration from adjoining areas not previously treated.

The number of reports and requests for assistance came from approximately 1,000 sources. Two hundred and forty investigations were made and 180 beaches were found to be infected. The number of beaches treated was 61 and relief was obtained from the itch at every beach treated. During this past season the state did not supply the necessary chemicals, treatment equipment, or labor since this was the rightful duty of the property owners receiving the benefits. The studies made in conjunction with the summer's activities did not reveal any additional research information other than that it was more practical to hand-sow pea-coal-size

copper sulfate crystals in shallow water ( $1\frac{1}{2}$  ft.) than fuss with the solution application method.

#### PROBLEM OF THE FUTURE

As already pointed out, it is quite evident that Michigan will continue to have an increase in the number of infections with swimmer's itch because of the various factors favoring its development. The present method of control which consists of killing the host snail of the Cercariae appears to be the proper method of attack.

The chemical control now being used is very effective under favorable conditions. However, it is still hoped that an easier, simpler, and less expensive method of killing the snails can be found.

Additional research on the life cycle of the Cercariae causing the itch, as well as on control methods, is necessary, if the best practical solution of this problem is to be obtained.



# The Community Health Education Program

The Hartford Plan  
*Audio-Visual Unit*

BENJAMIN G. HORNING, M.D., F.A.P.H.A.,\* LUCY S. MORGAN, Ph.D., F.A.P.H.A., BEATRICE HALL KNEELAND, F.A.P.H.A., AND ALICE H. HAMMAR

*Formerly Health Officer, Hartford; General Secretary, Hartford Tuberculosis and Public Health Society; Nutrition Director, Connecticut Dairy and Food Council; and Supervisor, Works Projects Administration Project, Hartford, Conn.*

THE Hartford Plan for Community Health Education which was begun during June, 1938, was discussed in a recent paper.<sup>1</sup> It was the first organized effort of official and nonofficial agencies in Hartford to coördinate their health education activities into a city-wide program, and it was pioneer work in a comparatively new field. The program was built around individual and community needs, and was centered about such agencies as community houses, schools, churches, and health guilds.

The first year's program created widespread interest and reached many groups and individuals in the city. It was a valuable experience and served as a guide in planning a Five Year Health Education Program, which was begun during September, 1939. The city has been decentralized into 12 health education districts, and the emphases of the program are placed on (1) Institutes for Leaders, (2) Methods Demonstrations in Schools, (3) Research, and (4) Public Relations.

The function of a health education program is to interpret knowledge concerning medicine and the related sciences to individuals in such a way as to motivate them to attain the maximum in health and welfare. To accomplish this, it is necessary to develop suitable teaching methods and technics with which to reach groups and individuals of various intellectual endowment, and educational and racial background. Since such mechanical media as the motion picture, radio, exhibit, and printed matter are indispensable in such work, one of the objectives of the Hartford Community Health Education Program is to provide the community with suitable audio-visual equipment and materials.

A survey was made of audio-visual material for health education, available from national, state, and local sources. Films, filmstrips, electrical transcriptions, exhibit material, and printed matter were reviewed from many parts of the country and such material as was suitable for use in the community was purchased or borrowed. The Connecti-

\* Now Associate Field Director, A.P.H.A.

cut State Department of Health, the Dairy and Food Council, and the Metropolitan Life Insurance Company were valuable sources of audio-visual health education aids.

The results of the Visual Health Education Material Survey have been compiled into a catalogue under such types of mechanical media as (a) films, (b) projection slides, (c) exhibits, (d) posters, (e) charts, (f) plays, and (g) printed matter. The material is listed under the following subjects: (a) adult health, (b) child hygiene, (c) dental hygiene, (d) communicable diseases, (e) housing, (f) laboratory, (g) maternal hygiene, (h) nutrition, (i) safety, (j) first aid, (k) sanitation, (l) tuberculosis and (m) venereal diseases. A brief description of each item is given. For example, the subject matter of a film is described, the showing time is noted, the agency from which it may be obtained is given, and the type of group for which it is suitable is suggested.

The Board of Health and the Tuberculosis and Public Health Society each purchased sound motion picture apparatus, talking disc film projectors, delineascopes, and other mechanical equipment. A central clearing bureau was established and equipment, operators, and mechanical media such as exhibits, films, and printed matter were made available to the entire community.

In order to assist local agencies in producing visual education material with local significance, the Board of Health is sponsoring a Works Projects Administration project. It supplements the work of existing agencies by making exhibits; taking pictures; making projection slides; manufacturing such exhibit aids as pamphlet racks, bulletin boards, and easels; transporting and setting up equipment and exhibits; showing films; writing publicity; keeping statistical records; and doing clerical work.

The personnel of the project usually consists of (a) supervisor, (b) commercial artist and assistant, (c) carpenter and assistant, (d) photographer, (e) motion picture operator, (f) publicity person, (g) utility man (h) statistical clerk, (i) mimeograph clerk, and (j) health record clerk. The floor space and office equipment are provided by the Board of Health. The cost of material used in making exhibits is borne either by the city or the agency for whom the exhibit is made. Transportation of exhibits has been furnished by city-owned truck or private automobile.

The health exhibit is being widely used in Hartford as a means of presenting health problems to the community. It is a type of mechanical medium designed to reach large numbers of persons, with the objective of transforming indifferent masses into interested individuals. Important sources of exhibit material have been the U. S. Public Health Service, the National Tuberculosis Association, the American Social Hygiene Association, the Metropolitan Life Insurance Company, the Aetna Life Insurance Company, the Connecticut State Department of Health, and the Dairy and Food Council. The most valuable exhibits have been those produced locally and having local significance. Such exhibits represent the combined efforts of state and city leaders with the staff of the WPA project.

In planning exhibits certain general principles are followed. The story is told with a few correlated facts. Simplicity of design with emphasis on color and motion is stressed. An effort is made to visualize the information in a manner suitable to the intellectual and educational levels of the individuals to be reached. The person requesting the exhibit presents the idea with factual material to the visual education supervisor. Various plans are discussed, consideration being given to message of exhibit, place to be displayed, persons

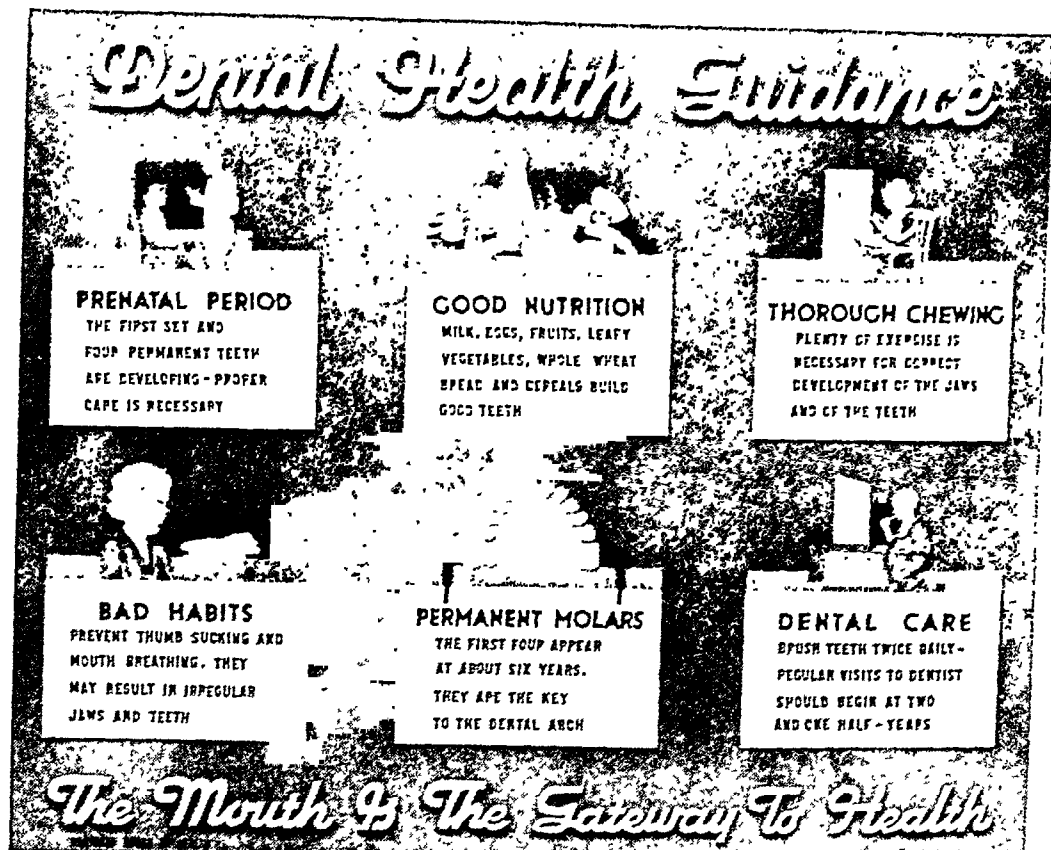


PLATE 1

to see exhibit, method of transportation, size, colors and cost. When a plan has been agreed upon, the supervisor discusses it with the artist, who interprets it in colored sketches. The sketches, including copy, are shown to authorities for criticism. The plans are then presented to the artist, carpenter, and other technical assistants for execution. Several conferences are often necessary before the exhibit is completed.

The length of this paper does not permit detailed description of all types of visual education aids used in Hartford, but certain exhibit material produced locally will be described briefly. Typical of the smaller exhibits is, "Dental Health Guidance" (Plate 1). The back board is made from  $\frac{3}{8}$ " plywood which is treated with several coats of shellac before painting. This wood is used extensively because it does not warp and will stand the necessary handling involved in frequent transpor-

tation. One-eighth inch plywood is used for the small pictures which are glued to the exhibit;  $\frac{1}{4}$ " plywood for titles and cut-out letters. It has been found from experience that screws as well as glue are needed because changes in temperature and transportation frequently reduce the strength of the glue. Cardboard cut-out letters were used for the subtitles in this exhibit. They can be purchased in various sizes and can be made effective when dipped in shellac and then painted to harmonize with the colors of the exhibit. Varnished, gummed letters which can be purchased in various sizes were used for the captions. The background of this exhibit is Italian blue, with the captions and the smaller cut-out letters in a shade of the same color. The caption panels are canary yellow, and the gummed letters black. Artist's oil paints were used for the cut-out pictures.

The "Food Wheel" (Plate 2) is an

excellent example of the three dimensional type of exhibit. It was made at the request of a member of the staff of the Connecticut State Department of Health, and suggests that the food dollar be divided into fifths to get the best returns in health. There are 27 models on the wheel which are hand-carved from white wood and painted in oils to give a realistic effect. White wood has been found especially good for small objects and for moldings and casings where extra thickness is needed. This exhibit has proved so popular that it has been necessary to make three duplicates.

Two large exhibits have been executed. One is called, "The Story of Syphilis." It consists of three panels each 3' x 9' hinged together and light enough to transport in an automobile. The background of  $\frac{1}{4}$ " plywood is painted a two-tone gray with lettering in light cream color. The center of interest is a reproduction of Columbus's flagship depicted in blue with accents of red. There are poster cards with factual material and photographs on the side panels. The title of the other large exhibit is, "Tuberculosis Is Preventable" (Plate 3). The letters are in red and blue. The center of interest is a black



PLATE 2

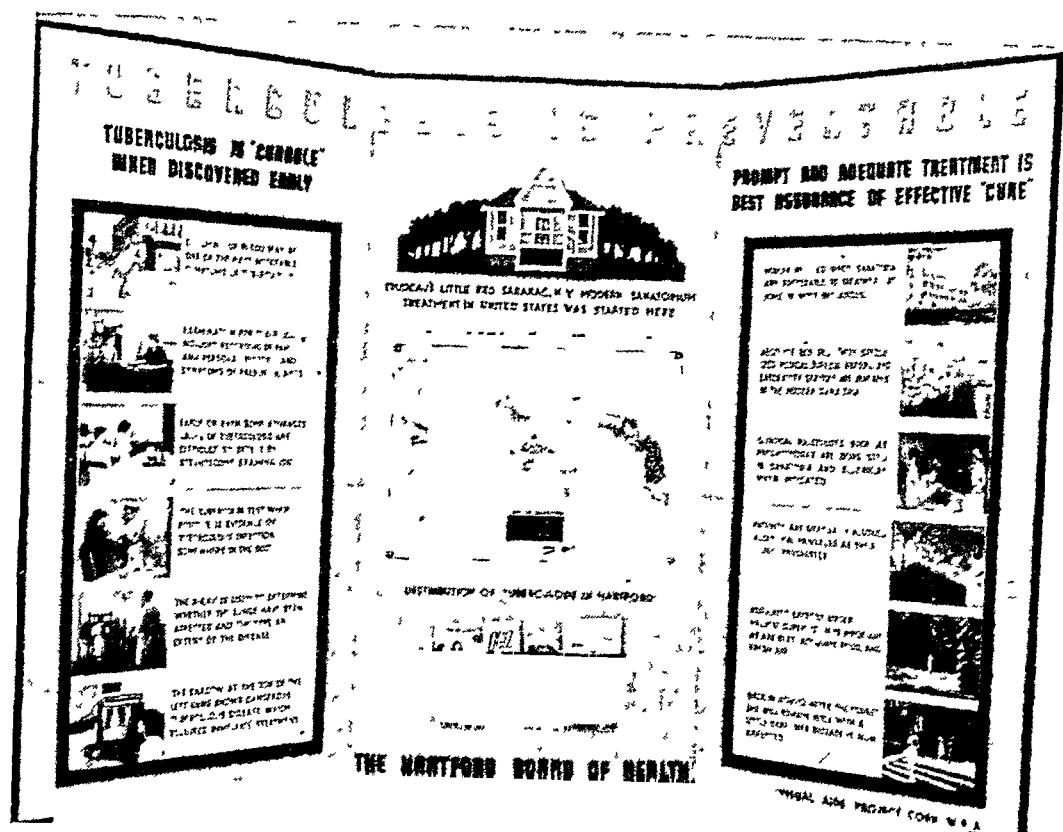


PLATE 3

photostatic map of Hartford on which all cases of tuberculosis in the city are located by means of colored map tacks. A model of "Little Red," Dr. Trudeau's cottage, carved out of wood is placed above the map. A clinical case of tuberculosis supervised by the Board of Health Clinic is presented by photographs which show various stages of

diagnosis, treatment, and rehabilitation of the patient.

Since March, 1938, in addition to exhibits borrowed or produced independently by local agencies, the WPA project in coöperation with local leaders has completed 23 exhibits. The plans and specifications, cost of material, and execution time have been carefully cal-

## EXHIBITS PRODUCED

No	Subject	Size	Cost	Places Exhibited	Attendance
1	Dental Health	43" x 50"	\$6 07	2	166
2	Dental Health Guidance	38" x 48"	7 06	6	3,186
1	Housing	36" x 144"	4 50	5	6,836
1	Pathogenic Bacteria	8" x 14" x 48"	7.91	4	710
2	Baby's Formula	34" x 47"	5 53	15	2,640
1	Well Child Conference	38" x 28"	5 44	8	1,350
1	Nutrition Exhibit	84" x 12"	18 55	5	6,430
1	Nutrition Exhibit	12" x 36" x 108"	23.95	22	15,680
2	Your Food Dollar	30" diameter	5.70	55	17,717
2	Your Food Dollar	32" diameter	5 70	47	19,915
2	Vitamin Exhibits	30" x 40"	4.70	38	18,093
2	Ragweed Eradication	70" x 33"	7 06	8	7,125
1	Ragweed Eradication	45" x 56"	9 26	5	2,900
1	Congenital Syphilis	38" x 24"	4 61	15	2,456
1	Story of Syphilis	84" x 108"	13 47	16	19,770
1	Tuberculosis	84" x 108"	34.10	19	18,951
1	Negro Health Guild	72" x 32"	7 00	2	1,075
				272	145,000

culated and placed on file so that the exhibit can be duplicated at any time. During the past 12 months the 23 exhibits have been seen by 145,000 persons. This figure does not include window or bulletin board displays, or exhibits in buildings where it was impossible to keep a record of attendance.

The Community Health Education Program has made extensive use of colorful posters. They have been used to illustrate various health activities, and have been made for such national occasions as Child Health Day, Social

annual reports and publications of local agencies.

Extensive use is made of photographs, and the photographer attached to the Visual Education Unit takes pictures showing various activities of the Community Health Program. For example, a series of pictures has been taken illustrating the preparation of the baby's formula, the Medical Well Child Conferences, the Tuberculosis and Syphilis Control Programs, the Negro Health Guild, and Ragweed Eradication Campaign. Many of these pictures have

#### POSTERS PRODUCED

<i>Subject</i>	<i>Size</i>	<i>Number</i>
Cancer	14" x 22"	80
May Day, 1939	14" x 22"	200
Child Health Services	14" x 22"	100
Your Child's Chances for Health	22" x 44"	235
Baby's Sun Bath	22" x 28"	1
A Baby's Day	24" x 32"	2
Prevent Diphtheria	14" x 19"	200
The Diseased Tooth	20" x 26"	1
Healthy Teeth	20" x 26"	1
We Brush Our Teeth	11" x 26"	2
Housing	20" x 24"	3
National Dairy Month	14" x 22"	200
Negro Health Week, 1939-40	14" x 22"	200
Nutrition	20" x 40"	1
Ragweed Eradication	22" x 28"	210
Syphilis, Charts and Posters	25" x 32"	5
Tuberculosis Campaign	14" x 22"	200
Special Health Meetings	18" x 30"	12
Communicable Disease Charts	36" x 40"	4
Educational Charts	24" x 30"	10
Total		1,667

Hygiene Day, Negro Health Week, Dairy Month, Early Tuberculosis Diagnosis Campaign, and others. They have been planned so that they can be duplicated by the silk screen process and, since November, 1938, a total of 1,667 posters concerning 20 subjects have been made. The cost of material per poster including silk screening has ranged from 5 to 20 cents.

The graphic presentation of statistical material has been an interesting and useful part of the program. Statistical data which have accumulated at the Board of Health and other agencies are tabulated, analyzed, and the results are shown graphically. Such material has been used on posters, for press and special articles, and to illustrate an-

been used in exhibits, and to illustrate press articles, and annual reports. It has been found that the press is glad to have pictures accompany news releases. Since March, 1938, a total of 224 pictures have been taken and 207 delinescope slides have been made.

The motion picture operator service is very much appreciated in the community. One operator is attached to the WPA project and two local agencies have operators whose services are available. Films have been shown at formal and informal meetings, before discussion groups, at industrial meetings, in clinic waiting rooms, in pool halls, and many other places. For the year ending June 30, 1940, there were 249 film showings of 38 films. This figure only

includes Hartford film showings arranged for through the central bureau.

The writer attached to the WPA project assists with local publicity. He writes radio dialogues, feature articles, does library research work, and interviews health authorities. He aids the press in giving publicity to the various activities of the Community Health Program and plans publicity for such special events as open forums, public health meetings, the Ragweed Elimination Campaign, the Clean-Up Campaign, Negro Health Guild activities, and others.

Special equipment with which to display visual education material is necessary. In addition to equipment which has been purchased by agencies, the following items have been made and are in use in the community.

#### VISUAL EDUCATION DISPLAY AIDS

Item	Number	Cost Each
Pamphlet Racks	15	\$5.00
Easels	60	.55
Bulletin Boards	20	1.50
Poster Blocks	60	.20
Poster Feet	40	.40

The mechanical media and equipment for health education in Hartford are

being widely distributed. They have been used in schools, district adult education classes, leaders' institutes, Health Division meetings, Visiting Nurse Association classes, National Youth Administration classes, nurses' training school classes, dietetic association classes, citizenship classes, Parent-Teacher Association groups, settlement houses, hospitals, libraries, theaters, clinic waiting rooms and industrial plants. Certain exhibits have been shown at the New England Health Institute, Boston, April, 1939; the Connecticut Public Health Association Meeting, Hartford, December, 1939; the New England Labor Meeting, Hartford, May, 1940; the New England Boy Scout Meeting, Swampscott, Mass., May, 1940, and the American Negro Fair, Chicago, July, 1940.

The meetings arranged for during the year ending June 30, 1940, are listed in Table 1. These data do not include groups and materials arranged for independently of the central bureau.

Data concerning mechanical media listed by subject and used in Hartford during the year ending June 30, 1940, and arranged for through the central bureau of the Community Health Education Program are given in Table 2.

TABLE 1  
*Meetings Arranged Through Central Bureau  
July 1, 1939, to June 30, 1940*

Group	Number	Attend- ance	Speakers	Subjects	Film Showings	Exhibits	Charts	Slides
District I	11	888	10	10	5	2	..	..
District II	27	2,535	26	26	25	10	3	105
District III	138	3,151	138	130	39	7	3	..
Board of Education								
Adults	12	863	11	8	15	8	2	34
Students	33	8,608	13	12	41	6	2	93
Teachers	5	273	5	5	5	2	..	45
Board of Health Personnel	3	56	1	1	2	1	..	..
Clinic Waiting Rooms	14	166	..	8	23	..	..	55
Church Groups	6	395	7	6	9	..	..	..
Industrial Groups	14	336	3	5	17	1	..	..
National Youth Groups	7	1,796	3	5	11	5	..	..
Parent-Teacher Groups	5	270	3	3	11	..	..	105
Professional Groups	25	849	44	22	11	2	10	..
Y.M.C.A.	1	11	1	1	6	..	3	..
Y.W.C.A.	8	216	5	6	13	2	12	..
Camps	18	2,781	19	19	..	7	3	..
Other Adult Groups	18	1,833	17	13	16	..	..	..
Totals	345	25,018	306	250	249	53	35	434

TABLE 2

*Mechanical Media Distributed Through Central Bureau  
July 1, 1939, to June 30, 1940*

Subject	Press				Number of Showings			
	Column		Pamphlets Distributed	Broadcasts	Films	Charts	Exhibits	Slides
	Articles	Inches						
Administration	68	449	4,839	2	5	5	..	432
Cancer	15	72	3,034	..	..	1	..	..
Diphtheria	..	..	4,930	..	8	301	..	..
Pneumonia	14	70	1,002	1	23	..	..	..
Tuberculosis	80	597	48,013	6	74	201	15	70
Venereal Diseases	35	198	8,425	6	26	22	27	30
Other Communicable Diseases	49	203	3,239	4	19	28	..	30
Food Sanitation	10	43	1,065	3	2	..	..	..
Milk Sanitation	7	91	1,600	2	2	200	..	..
Other Sanitation	21	191	24,220	6	7	260	5	30
Mental Hygiene	19	243	677	1	..	..	..	..
Nutrition	19	204	29,949	1	48	24	97	29
Housing	28	251	1,275	2	1	..	7	12
Laboratory	8	85	600	1	10	..	4	25
Maternal and Child Hygiene	34	261	9,764	11	6	493	18	24
Dental Hygiene	12	100	1,018	2	8	8	4	..
Public Health Instruction	79	725	9,356	7	6	22	..	133
Vital Statistics	1,099	4,273	4,150	1	..	..	..	..
Adult Hygiene	7	29	1,631	6	4	100	..	..
Miscellaneous	45	508	1,200	..	..	..	..	..
Totals	1,649	8,593	159,987	62	249	1,665	177	815

## DISCUSSION

The value of such mechanical media as the motion picture, the radio, the exhibit, and printed matter in the field of health education is well recognized. The mechanical media supplement the personal medium with the spoken word in teaching, lecturing, and consultation. They are less expensive than the personal medium, and they are well suited to arouse the interest of masses of the population, and to prepare and make them more receptive to the personal medium.

The possibilities for the use of the mechanical media in interpreting the factors concerned with health and welfare, so that persons will be motivated to healthier and happier living, have scarcely been touched. There is a wide and varied range of subject material which includes the entire field of medicine and the related sciences. The preparation of such media requires a source of authentic information and a staff with imagination, and artistic and technical ability.

At the time the Hartford Plan for

Community Health Education was outlined, a survey of visual educational material revealed a lack of suitable material for teaching purposes in local communities. Such material as was available naturally dealt with those factors concerned with health and welfare which pertained to the country as a whole or to large population groups. It was early recognized by persons directing the Hartford Community Health Education Program that visual educational materials were more effective for use in the local community if they dealt with specific problems as they existed locally.

At the Health Education Committee meeting which was held during June, 1938, plans for an audio-visual unit in Hartford were discussed. As mentioned above, local agencies purchased equipment, and mechanical media, and the Board of Health sponsored a WPA Visual Education project. The agencies and their members were enthusiastic about the work, and health education leaders in the community presented subjects to be visualized to the supervisor



of the Audio-Visual Education Unit. At first the mechanical media provided through the central bureau were used largely for those activities planned by the Health Education Program. Requests now come from the entire metropolitan area and certain of the material has had state and national distribution.

The experience in Hartford has demonstrated the need for a planned audio-visual unit. It is not possible for individual agencies to buy all the equipment they need, or to have on their staff skilled artists, photographers, and other technical workers to execute mechanical media of high quality. By pooling the resources of the community and providing a central clearinghouse, it is possible for a city the size of Hartford to provide such material for all agencies. The audio-visual unit

should be developed as a part of the Community Health Education Program.

#### SUMMARY

The experience in Hartford has demonstrated that (1) there is a lack of graded visual health education material for use in local communities; (2) that audio-visual teaching materials developed locally and pertaining to the local situation are usually more valuable than material produced for nation-wide distribution; (3) that a population unit of 100,000 or more should plan for an audio-visual unit; and (4) that the audio-visual unit should be recognized as an essential part of the Community Health Education Program.

#### REFERENCE

1. Morgan, Lucy S., and Horning, Benjamin G. The Community Health Education Program. *A.J.P.H.*, 30, 11:1323 (Nov.), 1940.

# Public Health Applications of High-Speed Photography\*

CLAIR E. TURNER, DR.P.H., Sc.D., F.A.P.H.A., MARSHALL W. JENNISON, PH.D., AND HAROLD E. EDGERTON, Sc.D.

*Professor of Biology and Public Health; Assistant Professor of Bacteriology and Sanitary Biology; and Associate Professor of Electrical Measurements, Massachusetts Institute of Technology, Cambridge, Mass.*

HIGH-SPEED properly describes single exposure photographs that are taken with exposures shorter than about 1/10,000 second, and motion pictures taken at speeds above 300 pictures per second. The unaided camera, with mechanical shutter, cannot take such pictures, because of both photographic and mechanical limitations.

The development by Edgerton, *et al.*<sup>1-4</sup> of electrical apparatus for producing intermittently flashing (stroboscopic) illumination and for high-speed photography has provided a superior technic for investigating and recording rapid motion. The technic also offers advantages in "still" photography—in "stopping" motion — as a result of the short duration, high intensity illumination.

In addition to its ability to record and to "stop" rapid motion, high-speed photography is useful for measurement and analysis. Since in multi-flash and in motion pictures the interval between flashes may be predetermined, the observer is able to record an action as a function of time. Likewise the velocity, shape, and acceleration of the

object photographed may be determined from the pictures.

This system of photography has already given results, unobtainable by any other method, on many types of motion problems, technical and non-technical. Among the subjects studied, which involve rapid motion, may be mentioned the cracking of glass, the quenching of steel, the atomization of liquid fuels, droplet formation by liquids, and studies of machinery, firearms, and propellers. High-speed studies of such physical activities as driving a golf ball, hitting a tennis ball or baseball, and kicking a football have produced useful as well as interesting results (Edgerton and Killian<sup>4</sup>).

In the biological field, high-speed photography has been used to study the rapid movements of the wings of insects and of birds, the reactions of human subjects to unexpected light and sounds, and certain animal movements. Jennison and Bunker<sup>5</sup> utilized high-speed motion pictures for recording and analyzing the movements of cilia. One of the recent public health applications is that of demonstrating the production of droplets in sneezing, and in studying their number, size, and velocity of expulsion (Jennison and Edgerton,<sup>6</sup> Jennison,<sup>7</sup> Jennison and Turner<sup>8</sup>).

\* Contribution No. 183 from the Department of Biology and Public Health. Read Before the Public Health Education Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 10, 1940.

With this apparatus, which substitutes an instantaneous, intense flash of light for the relatively slow opening and closing of a camera shutter, exposures may be made as short as  $1/1,000,000$  second, and motion pictures may be taken at 6,000 or more frames per second. The faster the motion to be photographed, the shorter must be the exposure in order to "stop" it. For example, to "stop" rifle bullets traveling at 2,700 feet per second,  $1/1,000,000$  second is not too brief an exposure. On the other hand, to record one of the fastest of biological reactions, a sneeze, a relatively long exposure of  $1/30,000$  second will "stop" droplets having velocities up to 150 feet per second.

It is the light source and its control circuit, not the camera, which is the unique part of this new apparatus. Any standard camera and film may be used, although certain changes must be made in motion picture cameras.

#### THE EDGERTON APPARATUS

An excellent non-technical discussion, with bibliography, of high-speed photographic methods is given by Edgerton and Killian.<sup>4</sup>

The various forms of the Edgerton lighting equipment will give either a single flash for taking a single "still" picture, or a series of flashes with a predetermined interval of time between them for taking a single multiple exposure photograph or a motion picture.

The heart of this new apparatus—except for special work necessitating a spark source—is the gas-filled light-tube; illumination is produced by the discharge of a condenser (charged to 1,000–3,000 volts) through this tube. Suitable control circuits must be employed with the tube (Figure 1). The light illuminates the object to be photographed with an intense flash of short duration, "stopping" motion by providing an exposure time so short that the fastest object does not move

any appreciable distance during the exposure.

The intensity of illumination cannot be measured precisely, but photographically it is equivalent in intensity to the light from some 40,000 ordinary 50-watt electric light bulbs, or on the order of a few million candle power. The intensity of the light is so great that even in daylight, indoors, the apparatus may be used to give a dark-field effect, showing up minute particles which otherwise would not be visible. The high intensity usually makes it unnecessary indoors to consider the amount of other light when making camera adjustments. For most work in biology, exposures of from  $1/50,000$  to  $1/30,000$  second are adequate to "stop" motion.

Single pictures may be taken with any ordinary camera, using this light source. The light "substitutes" for the camera shutter in the sense that it gives an extremely short exposure during the relatively long time that the shutter is opening and closing. It is convenient to have an electrical contact on the



FIGURE 1—Arrangement of subject and apparatus for photographing sneezes. The light-tube is mounted in the parabolic reflector behind the subject.

shutter to set off the flash when the shutter is wide open. The shutter setting is not important.

Multiflash photography, that is, multiple exposures on the same film, is useful for recording certain types of motions, and is much less expensive than motion pictures when it can be substituted for them. Two or more lights are used, which flash in sequence with a short, known interval of time between the flashes. This interval may be varied down to  $1/200,000$  second or less. More light control equipment is necessary for multiflash work than for single-flash pictures, but the same camera may be used. The duration of each flash is commonly about  $1/100,000$  second.

High-speed motion pictures require rather complicated light control equipment, and a mechanism for moving the film at high speed. In the camera (without shutter) the film is moved past the lens at a constant and rapid rate. Each time the film has moved the distance occupied by one picture, the subject is illuminated by a flash of light. The time at which the flash occurs is controlled by a commutator attached to the film-driving mechanism. The duration of each flash is about  $1/100,000$  second, which effectively prevents blurring of individual pictures.

#### AVAILABILITY OF EQUIPMENT

A commercial form of the Edgerton single-flash lamp and control equipment is made by the Eastman Kodak Company under the name of Kodatron Speed Lamp. With this portable light source, single "stop-motion" pictures may be taken using any standard camera. The Speed Lamp operates on 110 volts a. c. This lamp gives an exposure of about  $1/5,000$  of a second, and while designed primarily for portrait work, it will "stop" motions having speeds up to about 15 feet per second.

High-speed motion picture camera equipment and multiflash apparatus is available from the General Radio Company, Cambridge, Mass., on special order.

#### PUBLIC HEALTH APPLICATIONS

Relatively few public health applications of this method of high-speed photography have been made, because as yet the equipment has been available only in a few laboratories. The new portable equipment will greatly extend the usefulness of the technic. There are several unique advantages in stroboscopic-light photography. It will stop the fastest motion. The intensity of illumination is so great that the amount of light already present indoors may be disregarded. The period of exposure is so brief that subjects in hospitals, laboratories, or industry need not pose. Moreover, the light is not painful to the eyes.

*Studies of Motion—Photographing the Sneeze*—As illustrative of many of the types of records and measurements which can be obtained with complete high-speed photographic equipment, some of our studies on sneezing, still in progress, will be discussed.<sup>6, 7, 8</sup> Most of the results could not have been obtained without stroboscopic-light photography. The pictures have value in health education, as well as in studying communicable disease control.

Single flash pictures will show the expulsion of droplets at any stage of the expiratory phase of the sneeze. Most droplets are "stopped" with an exposure of  $1/30,000$  second. By placing the light source at the side of the subject's face away from the camera (Figure 1), the droplets are illuminated with a dark-field effect. Photographic images of the particles may be larger than actual droplet size, particularly if the droplets are not in sharp focus. In violent, unstifled sneezes, droplet numbers are in the thousands and tens of



FIGURE 2—A typical violent sneeze. The close approximation of the teeth results in effective "atomization" of the saliva. Many droplet images are larger than actual droplet size. Exposure  $1/30,000$  second.



FIGURE 3—Sneeze from subject with a bad cold. Note masses of viscid mucus, which is less effectively "atomized" than saliva. The eyes are characteristically closed. Exposure  $1/30,000$  second.

thousands (Figures 2 and 3). Measurements of droplet size indicate that the majority are usually less than 2 mm. in diameter, and many are less than 0.1 mm.

From the single flash photographs we also note that the involuntary closing of the mouth near the end of a sneeze increases the efficiency of "atomization," producing more and smaller droplets. The droplets come largely from the saliva in the front of the mouth. Also, the number of droplets issuing from the nose is insignificant compared with the number expelled from the mouth. These observations may be important in relation to infectivity, because of differences in the microbic flora of the two regions. As a physiological phenomenon, it is of interest that the eyes are closed, in a natural sneeze, during the expulsion of droplets. This closing is part of the respiratory reflex, and is not caused by the light used in taking the pictures.

Single flash photographs have also shown that the handkerchief or hand held over the mouth is highly effective in preventing expulsion of potentially infective droplets in the air (Figure 4). Some face masks are effective for this purpose, other are less so. Droplets of saliva given off in talking, and particularly in pronouncing consonants, have been photographed, as well as cough droplets.<sup>8</sup>

For obtaining droplet velocities, both multiframe photographs and high-speed motion pictures were employed. With both of these methods, the time interval between successive exposures is known, and measurements of droplet displacements will give the velocity. "Muzzle velocities" up to 152 feet per second in violent sneezes have been recorded, although velocities considerably less than this are more common. The majority of droplets are not expelled farther than 2 or 3 feet, although large masses may travel 12 feet or more.



FIGURE 4—A handkerchief or the hand held over the mouth in sneezing or coughing is an effective means of preventing the expulsion of potentially infective droplets into the air. Exposure 1/30,000 second

Large droplets fall to the ground; smaller ones evaporate. Evaporation of moisture leaves the bacteria in the droplets suspended in the air; these airborne "droplet nuclei" are important in the dissemination of disease, according to W. F. Wells.<sup>9</sup>

High-speed motion pictures, at 1,300 frames per second, also gave a method for investigating the movements of the head in sneezing. A typical sneeze consists of a short inspiration, followed by a forcible expiration. At the inspiration the head is thrown back; a rapid down-stroke of the head, and expulsion of droplets then takes place. From the beginning of the down-stroke of the head, to the expulsion of droplets and the end of this movement, the time may be as little as 0.07 second.<sup>7</sup>

These sneeze studies demonstrate several applications of stroboscopic pho-

tography. Velocity measurements, body movements, and particle size are obtainable. In particular, the intense light will show up minute particles which otherwise would not be visible under ordinary conditions.

As regards the study of particles in motion in the air, a number of other applications of public health interest are indicated for high-speed photography. In the field of industrial hygiene, dusts, fumes, and smokes are important. Their presence, even if of small particle size, can readily be demonstrated. Their production and removal, even if at high velocities, can be studied. The efficiency of equipment in atomizing liquids may be permanently recorded; spraying processes, involving poisonous materials, can perhaps be better controlled after proper study. These photographic methods may often be used to demonstrate graphically, as evidence or for health education, the presence of particles, the existence of which had not been realized.

**Color Photography**—With suitable filters, stroboscopic-light photographs may be taken in color as illustrated by photographs of brilliantly colored humming birds in motion. Besides offering a standard illumination for color photography, stroboscopic light can be used more readily than other lights from the point of view of the subject being photographed. Photographs of skin lesions, records of fungal infections, operations, etc., are more easily obtained, since the subject need not pose, and is hardly aware of the light. The successful but trying experiences of one of the writers in using continuous, artificial illumination in the color photography of skin lesions in some of the common communicable diseases have emphasized the advantages of stroboscopic light.

**Photomicrography**—The possibilities here have been little investigated, but

certain definite advantages obtain with intermittent light, whether for "still" pictures or for motion pictures. The control instruments can be used to produce illumination from a spark source rather than from the light-tube. A spark approximates a point-source of light, and is therefore particularly useful for photomicrography. Furthermore, the intermittent light is advantageous in that it will not injure living microorganisms as readily as continuous light. Such records will, therefore, be more "normal."

**General Photography**—For general use, particularly in photographing human subjects, stroboscopic light is superior. Posing is unnecessary, time is saved, and the duration of the flash is so short that it has no bad effects on the eyes. Such advantages are most important in photographing sick patients and children. It would appear particularly advantageous for the public health worker in making indoor action pictures of any kind. Under certain conditions this method of photography can also be used outdoors.

#### REFERENCES

1. Edgerton, H. E., and GERMESHAUSEN, K. J. Stroboscopic-light High-Speed Motion Pictures. *J. Soc. Motion Pic. Eng.*, 23, 5:284 (Nov.), 1934.
2. Edgerton, H. E., GERMESHAUSEN, K. J., and Grier, H. E. High-Speed Photographic Methods of Measurement. *J. Appl. Physics*, 8, 1:2 (Jan.), 1937.
3. Edgerton, H. E., GERMESHAUSEN, K. J., and Grier, H. E. Multiflash Photography. *Photo. Technique*, 1, 5:14 (Oct.), 1939.
4. Edgerton, H. E., and Killian, J. R., Jr. *Flash! Seeing the Unseen by Ultra High-Speed Photography*. Hale, Cushman and Flint, Boston, 1939.
5. Jennison, M. W., and Bunker, J. W. M. Analysis of the Movement of Cilia from the Clam (*Mya*) by High-Speed Photography with Stroboscopic Light. *J. Cell. & Comp. Physiol.*, 5, 2:187 (Oct.), 1934.
6. Jennison, M. W., and Edgerton, H. E. Droplet Infection of Air: High-Speed Photography of Droplet Production by Sneezing. *Proc. Soc. Exper. Biol. & Med.*, 43, 3:455 (Mar.), 1940.
7. Jennison, Marshall W. The Dynamics of Sneezing: Studies by High-speed Photography. *Scient. Monthly*, 52, 1:24 (Jan.), 1941.
8. Jennison, Marshall W., and Turner, Clair E. The Origin of Droplet and Air-borne Infection. *Trained Nurse & Hosp. Rev.*, In press.
9. Wells, W. F., Wells, M. W., and Mudd, Stuart. Infection of Air. Bacteriologic and Epidemiologic Factors. *A.J.P.H.*, 29, 8:863 (Aug.), 1939.

# Value of Bacteriophage Determinations as a Supplemental Procedure in the Diagnosis of Bacillary Dysentery\*

K. M. WHEELER, PH.D., AND A. L. BURGDORF, M.D.

*Bureau of Laboratories and Bureau of Preventable Diseases, State Department of Health, Hartford, Conn.*

THE laboratory diagnosis of dysentery has depended principally on detection of causative organisms in stools from cases of the disease.<sup>1</sup> Results of this procedure have not been wholly satisfactory since the organisms are usually difficult to detect except during the first few days after onset. A supplemental procedure which sometimes is of use, although difficult of interpretation, is the agglutination test of patient's serum against known strains of dysentery organisms. The apparent value of another supplementary method for determining etiology in cases of diarrhea, examination for bacteriophage, was pointed out by Feemster.<sup>2, 3</sup> His report of an outbreak of *Shigella paradysenteriae* (Hiss-Y-type) infection showed that phage acting on that strain of paradysentery could be detected in a high percentage of cases (80 per cent during the second and 45 per cent during the third week after onset).

During a recent institutional outbreak of dysentery caused by a Strong variety of *Shigella paradysenteriae* we have had occasion to examine stool specimens for bacteriophage. Since

from most cases fecal specimens were not available for bacteriological examination at the state laboratory until some time after onset, it seemed that examination for bacteriophage might be useful in identifying the cases.

## METHODS

For bacteriophage determinations the fecal specimens were taken in sterile containers without preservative and examination was begun 2-6 hours after collection. Upon arrival at the laboratory approximately 10 gm. of specimen were transferred to a 100 cc. centrifuge tube; about 50 cc. of sterile broth were added, mixed with the specimen, and allowed to stand for 1 to 2 hours at room temperature. After centrifugation at high speed the clear supernatant was filtered through Berkefeld N candles. One cc. of filtrate was added to 0.5 cc. of 18-24 hour broth culture of *Shigella paradysenteriae* and incubated at 37°C. In all instances a strain of paradysentery isolated from the outbreak was used; sometimes several strains as well as stock paradysentery strains were included as test organisms. After incubation for 1, 2, and 4 days, a large loopful of the filtrate-culture mixture was transferred to a tube containing 2 cc. of a young broth culture of the organism. A

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.



large loopful from this tube was then spread over a sector of an agar plate. After overnight incubation the plate was examined by oblique transmitted light against a black background. Bacteriophage was indicated by areas in the seeded sector which showed no growth. The areas varied from minute scarcely visible plaques, few in number on some specimens, to almost complete lysis and absence of growth over the entire sector. Platings were made in this manner even though the original filtrate-broth mixture showed clearing of turbidity.

Stool cultures for dysentery organisms were made according to the routine methods<sup>4</sup> on both eosine-methylene-blue and desoxycholate citrate agars. The isolated pure cultures were identified biochemically and serologically. Agglutination tests with patient's serum were performed in the usual manner against stock *Shigella* cultures and also against strains isolated during the outbreak. Titers of 1:320 or higher have been called positive.

RESULTS

Ninety-three fecal specimens from 61 individuals were examined for bacteriophage; 20 were clinical cases of dysentery; the remaining 41, many of whom were in contact with the disease, showed no clinical symptoms although stool cultures from some of these repeatedly yielded dysentery organisms.

*Clinical cases*—Relationship of the time interval between onset of symp-

toms and laboratory examination, to the results of culture and of phage examinations on 20 clinical cases of dysentery is shown in Table 1. The earliest specimens examined for phage were collected during the 3rd week after onset and from the 3rd through the 9th week phage was isolated in a high proportion of specimens—72.7 per cent. Ten weeks after onset no positive specimens were found. Cultural examination of the same individuals showed a much lower proportion of positive results, averaging 13.8 per cent for this 7 week period. The figures for the latter part of this interval appear high, however, in view of other reports.<sup>1, 2</sup> *Shigella* organisms were isolated from 5 specimens from 3 patients after the 10th week. Phage examinations were not made on all of these cases at the time of the positive cultures but within 2 weeks afterward were found to be negative. One case has been a persistent carrier of the organism with repeated negative phage tests over a 5 month period.

Further information concerning the 20 clinical cases is given in the first part of Table 2 which shows the relationships between clinical symptoms, bacteriophage examinations, stool cultures and agglutination tests. Six cases were positive by both culture and phage tests and 3 of these had significantly strong agglutinins. Nine cases were missed by cultural examination but carried phage when examined before the 10th week after onset. Repeated cul-

TABLE 1

*Relationship of Time Interval Since Onset to the Results of Cultural and Bacteriophage Examinations of Fecal Specimens from Clinical Cases of Bacillary Dysentery*

Week after onset	Stool Cultures			Bacteriophage Tests		
	Number Examined	Number Positive	Percentage Positive	Number Examined	Number Positive	Percentage Positive
1-2	6	3	50.0	0	0	
3-4	21	2	12.7	6	4	66.7
5-6	21	4	19.0	6	5	83.3
7-8	22	2	14.3	10	7	70.0
9-10	13	2	15.4	14	0	0.0
			Average 13.8			Average 72.7

TABLE 2

*Relationships Between Clinical Symptoms and Results of Laboratory Diagnostic Tests for Bacillary Dysentery*

Clinical Symptoms	Bacteriophage Determination	Cultural Examination	Agglutination Test	Number of Individuals
+	+	+	$\frac{+}{-}$ X*	$\left. \begin{array}{c} 3 \\ 2 \\ 1 \end{array} \right\} 6$
		-	$\frac{+}{-}$ X	$\left. \begin{array}{c} 6 \\ 3 \\ 0 \end{array} \right\} 9$
	-	+	$\frac{+}{-}$ X	$\left. \begin{array}{c} 1 \\ 2 \\ 0 \end{array} \right\} 3$
		-	$\frac{+}{-}$ X	$\left. \begin{array}{c} 1 \\ 1 \\ 0 \end{array} \right\} 2$
-	+	+	$\frac{+}{-}$ X	$\left. \begin{array}{c} - \\ 7 \\ 2 \end{array} \right\} 9$
		-	$\frac{+}{-}$ X	$\left. \begin{array}{c} 1 \\ 1 \\ 0 \end{array} \right\} 2$
	-	+	$\frac{+}{-}$ X	$\left. \begin{array}{c} - \\ 3 \\ 5 \end{array} \right\} 8$
		-	$\frac{+}{-}$ X	$\left. \begin{array}{c} - \\ - \\ 22 \end{array} \right\} 22$

\* X Agglutination tests were not done.

tural examinations were made in these, as in the other cases, although with one exception the earliest specimens were not collected before the 3rd week. The 3 individuals in the next group are of special interest since they gave positive stool cultures while specimens examined for phage at the same time and later were negative. Paradyseutery organisms were first isolated during the 4th week after onset, and were found at intervals over a considerable period—during 14 weeks from one patient. To eliminate the possibility that variation in either phage or culture might account for the failure to demonstrate phage in these cases, fecal filtrates from 2 of them were tested against several isolations of *Shigella paradyseuterieae* obtained from the same cases. All tests were negative. The 2 remaining clinical cases shown in

Table 2 were negative by culture and phage tests, although 1 had significantly high titering agglutinating antibodies.

*Non-clinical cases*—Specimens were tested for phage from 41 individuals without clinical symptoms; 17 had positive stool cultures. Two groups of apparently uninfected individuals were selected as a control to evaluate the significance of the phage determinations. One group of 13 was from the same building in which the outbreak occurred and each had had at least 5 negative stool cultures at the time of examination; 12 other patients were selected from a different building. These groups provided a control having age distribution and environmental factors similar to the infected group. Bacteriophage for *Shigella paradyseuterieae* was isolated from 2 in the first group, and

subsequently a positive stool culture was obtained from 1 of these. One person in the second group yielded phage, and moderately strong agglutinins were detected in her blood serum. The remaining 22 gave negative tests.

Results of the various laboratory tests on the 41 individuals who had shown no clinical symptoms of dysentery are given in the second part of Table 2. Eleven exhibited phage, and from 9 of these the organism was isolated. On the other hand, positive cultures were obtained from 8 whose phage tests were negative. As a further check on these individuals the filtrates were tested against the autologous dysentery strains, but in no case was phage demonstrated. The final row in Table 2 shows 22 of the control individuals who were negative by all laboratory tests.

#### CHARACTERISTICS OF THE BACTERIO-PHAGE STRAINS ISOLATED

Specificity tests were made on 4 phage strains. Three were from different clinical cases of which only 1 yielded positive cultures for dysentery organisms. The 4th strain was from a sub-clinical infection since the organisms were isolated, and yet no clinical symptoms were observed. Specificity tests were made on broth filtrates after 10 serial transfers on a dysentery strain isolated from the outbreak. Dilution of the original filtrate at the time of test was approximately  $1 \times 10^{25}$ . The technic was similar to that employed in testing stool filtrates for phage, and in all instances readings were made by examining plates inoculated with phage-filtrate mixtures.

The phage strains were specific for certain *Shigella* organisms since no lytic action could be detected when tested against 10 *Escherichia*, 10 *Aerobacter*, 4 *Proteus*, 6 *Salmonella* and *Eberthella*, 1 *Serratia*, and 2 *Pseudomonas* strains. Among strains in the *Shigella* genus no lysis occurred with stock *Shigella dysen-*

*teriae* Shiga (2 strains), *Shigella ambigua* Newcastle (5), *Shigella madampensis* (*dispar*), *Shigella alkalescens* (3), *Shigella sonnei* (3). When tested against stock strains of *Shigella paradysenteriae*, lysis occurred with Flexner V, W, X, and Y, Hiss, Strong, and Army types, but action on two strains labeled Harris and Flexner H. could not be detected.

The 4 phage strains were also tested against 70 strains of *Shigella paradysenteriae* isolated from the outbreak, and all except 3 were susceptible to phage action. The 3 resistant strains were isolated at the hospital early in the outbreak from clinical cases, of which 2 died and the 3rd was severely ill. When examined at the state laboratory these 3 strains gave biochemical reactions identical with the phage-susceptible strains. Serological reactions, however, differed from others tested at that time in being weaker with Hiss and Strong antisera and stronger with antiserum prepared with the Harris strain (which was phage resistant). Unfortunately, phage determinations could not be done on specimens from the 3 individuals.

In no case did the 4 strains of bacteriophage differ qualitatively in their virulences when tested in the above series against 125 cultures of Gram-negative rods in the family Enterobacteriaceae.

A further check on the identity of the phage strains was made by (1) comparison of morphological characteristics of the plaques, and (2) comparative cross-resistance tests on variants of a single susceptible strain.

When plated with the same strain of susceptible paradysenteriae all phage isolations appeared to have essentially the same plaque form, and no differentiation could be made on the basis of size or of marginal characteristics.

Comparative cross-resistance tests were made with 10 strains of phage using resistant variants produced by

growth of the phage in a broth culture of *Shigella paradysenteriae* strain 18,601 isolated during the outbreak. After a 5 day incubation period, mixtures of culture and phage were plated, and colonies picked to broth. They were then tested by the method of Ashehov,<sup>5</sup> which consists of inoculation of a sector of an agar plate with the test organism followed by addition of a small drop of the phage filtrate. After incubation a susceptible strain will show no growth in the area to which phage has been added. By this method resistant variants to 10 strains of phage were tested against each of the 10 strains. The phage strains were isolated from clinical cases, from subclinical cases, and from culturally negative individuals. In all cases the phage strains were purified by at least 3 successive platings and pickings from isolated plaques. Some of the strains were also carried for 10 or more successive transfers on a strain of *Shigella paradysenteriae* before plating. Results of the cross-resistance tests showed that 9 of the 10 strains appeared to be identical in that a variant of *Shigella* culture 18,601 which was resistant to one strain of phage was resistant also to the other 8 strains. In all cases smooth variants were used for these tests. An occasional rough resistant variant was produced, but when tested, these also failed to show differences between the 9 strains of phage. Strain 39 was unlike the others in that it lysed all but one (69) of the other strains. It is interesting that strain 39 was isolated from an individual in one of the control groups, previously mentioned, who was apparently well but from whom a strain of *Shigella paradysenteriae* was isolated subsequent to the positive phage test. Her phage tests were positive over a 9 week period, concurrently, during the latter part, with positive stool cultures. When tests were carried out with resistant variants produced from other *Shigella* strains, similar results were ob-

tained, although minor differences in virulence of the phage strains appeared. These seemed to be quantitative rather than qualitative. With the exception of isolations from one individual, phage strains obtained during the outbreak appeared to belong to a homogenous group.

#### DISCUSSION

From the extensive literature on the widespread occurrence of bacteriophage in fecal material its isolation would seem to have little diagnostic significance. That this is not true for the present series of tests is amply shown by the control examinations. Of the 25 people selected for the control, comprising an age and environmental group similar to the group of clinical cases, 3 phage isolations were made, of which only 1 lacked other confirmatory laboratory evidence of infection. Furthermore, 8 months after the beginning of the outbreak 62 individuals in one ward of the same building where the outbreak occurred were examined for phage. Many of these people were recovered cases or had been subclinical infections whose stool cultures had been negative for several months. Phage acting on the test strain 18,601 was isolated from 3 people. However, these bacteriophage strains were considerably different in plaque form, in specificity, and in cross-resistance tests from the previous strains. Repeated examinations of the 3 people failed to show *Shigella paradysenteriae*. Possibly the low incidence of phage in the control groups is due in part to the use of an indicator strain of *Shigella paradysenteriae* isolated from the outbreak which would tend toward limiting the detection of phage to specific races. On some specimens, however, several organisms were used, including stock *Shigella* cultures with no difference in results.

In certain types of dysentery outbreaks, particularly institutional epi-

demics, examination of stool specimens for bacteriophage appears to be of value as a supplementary procedure for laboratory diagnosis. This is especially true when examinations cannot be made until some time after onset of symptoms, even though with the newer differential plating media cultural examinations are increasingly more satisfactory. Among the 20 clinical cases of dysentery which we have examined, phage was isolated from 9 (45 per cent of the total) bacteriologically negative individuals. However, apparently not all cases develop a phage since we encountered one person, a very mild case of dysentery, on whom repeated phage examinations were negative even though she has continued to yield the organism intermittently for at least 5 months after the beginning of the outbreak. Another of this type was found among the subclinical infections. Others from whom cultures were intermittently positive over relatively long periods of time cleared up without demonstrable phage although it is possible that phage was present and disappeared quickly since determinations were not made until 2 or 3 weeks following the last cultural isolation.

Several individuals gave concurrently positive culture and phage tests for varying periods of time up to 2 weeks. Organisms isolated from these individuals were susceptible to the phage strain, but apparently the *in vivo* activity was not sufficiently strong to eliminate the organisms. The fact that a low proportion of specimens were positive culturally for a considerable time and that sometimes consecutive positive specimens were 5 or 6 weeks apart, with as many as 12 negative examinations in the interval, suggests that the phage might have been exerting some *in vivo* action.

Phage determinations should be made only as a supplementary procedure since, as we have shown, phage cannot

always be detected in individuals known to be infected. However, the value of the examination is amply shown by the relatively large number of known clinical cases, from whom dysentery organisms were never isolated but who carried phage, acting on the specific strain involved in the outbreak. At least a brief study of the characteristics of the phage strains isolated in an epidemic, particularly to show homogeneity, aids in interpreting the significance of the phage. The value of agglutination tests with patient's serum appears to lie chiefly in confirming other diagnostic means.

#### SUMMARY AND CONCLUSIONS

Cultural and bacteriophage examinations of specimens from 61 individuals, including 20 clinical cases of bacillary dysentery, have shown that:

1. Bacteriophage for a strain of *Shigella paradysenteriae* involved in the outbreak could be isolated during the 3rd to 9th week after onset from a high proportion of specimens from clinical cases, 73 per cent, compared with 13 per cent from which the organism could be recovered.

2. Bacteriophage but not *Shigella* organisms were isolated from 45 per cent of the clinical cases during the 3rd to 9th week after onset. Only 15 per cent yielded positive cultures with negative phage tests.

3. Some individuals with clinical and some with inapparent infections failed to show phage; positive cultural examinations on these individuals subsequently became negative without laboratory evidence of the action of the phage.

4. Phage isolated from infected individuals, for the most part formed a homogenous group with respect to plaque form, specificity and cross-resistance tests. The presence of these strains of phage appeared to be "diagnostic" since they were isolated in only one instance where there was no other laboratory or clinical evidence of infection.

5. Neither cultural nor bacteriophage tests separately provided as much information for diagnosis as the two combined. Bacteriophage determinations are valuable as a supplementary test to cultural examination in the study of outbreaks of dysentery, especially when examinations are made some time after onset of disease.

## REFERENCES

1. Havens, L. C. *The Bacteriology of Typhoid, Salmonella and Dysentery Infections and Carrier States*. The Commonwealth Fund, New York, 1935.
2. Feemster, R. F. Use of Bacteriophage in Diagnosis of Bacillary Dysentery. *J. Infect. Dis.*, 55:190, 1934.
3. Feemster, R. F. Epidemiological Value of Isolating Bacteriophage in Outbreaks of Intestinal Infection. *A.J.P.H.*, 24:1109, 1934.

4. Mickle, F. L. Approved Method EN-1. Issue of Dec. 15, 1939, *Stool and Urine Cultures for Enteric Disease Organism*; Division of Diagnostic Microbiology Laboratory Methods. Bureau of Laboratories, Connecticut State Department of Health, Hartford, Conn.
5. Ashehiov, I. N., Ashehiov, I., Kahn, S., Labiri, M. N., and Chatteiji, S. K. Classification of Bacteriophage and its Practical Application. *Indian J. M. Research*, 20:1127, 1933.

---

## National Health Library

THE National Health Library, administered by the National Health Council, is now settled in new quarters at 1790 Broadway, New York, N. Y., and is prepared as formerly to furnish loan and bibliographical service to members of the American Public Health Association and other National Health Council Agencies. According to Isabel Towner, the Librarian, this collection is the most complete on public health in this country and is especially noteworthy for its index catalog on cards. In this are listed under author and subject not only the 6,000 books and 30,000 pamphlets now making up the collection, but also articles on public health and allied subjects in current magazines. Public health workers interested in specific subjects find here up-to-date material under subject and author. The

Library receives about 500 magazines. State and city health department bulletins are also indexed. These are not included in any other index. The files of these bulletins, some dating from 1920, form an especially valuable source of material. The Library is preparing a special card index on the health aspects of national defense, preparedness, and war.

Every Friday the Library issues a mimeographed list of selected articles, a weekly index to current periodical literature in the field of public health. There is a small annual subscription for this Library Index. The articles included are classified under such general heads as communicable disease, health education, industrial hygiene, national defense, public health nursing, social hygiene, tuberculosis, etc.

# Rôle of Rats in the Spread of Food Poisoning Bacteria of the *Salmonella* Group\*

HENRY WELCH, PH.D., M. OSTROLENK, AND  
M. T. BARTRAM, PH.D

Senior, Assistant, and Associate Bacteriologists, Division of Bacteriology,  
U. S. Food and Drug Administration, Washington, D. C.

THE fate of *Salmonella enteritidis* when fed to rats under laboratory conditions was demonstrated in a previous publication.<sup>1</sup> Transmission of infection with *Salmonella enteritidis* from an infected rat to cage mates and the existence of the carrier state in a small number of infected rats as long as the 40th day after infection was also shown. The absence of *Salmonella* infection and agglutinins for organisms of the *Salmonella* group in 800 normal laboratory animals was reported. In the present investigation these studies have been extended to include the longevity of *Salmonella enteritidis* in rat pellets, the minimum dose of this organism necessary to provoke infection in rats and mice and the distribution of *Salmonella* in rats and mice pellets collected throughout the United States.

Attempts to isolate organisms of the *Salmonella* group from rat or mouse excreta have usually been made because of food poisoning outbreaks. As far as can be determined from the literature no attempt has been made previously to study rodent pellets collected over a

large area without regard to history of intestinal disease. Savage and White<sup>2</sup> isolated *Salmonella enteritidis* from the intestines of rats but failed to demonstrate these organisms in their excreta while Salthe and Krumweide<sup>3</sup> were successful in isolating *Bacillus pestis-caviae* from rodent excreta obtained in a bakery where prepared cream filling was shown to be the cause of a food poisoning outbreak. Our preliminary<sup>1</sup> studies appeared to indicate that infected rats excrete the infecting organism intermittently. Because of this, it would seem that a study of the incidence of *Salmonella* in rat or mouse excreta would be of more significance from the standpoint of food poisoning potentialities than a similar study of the organs of the rodents. Isolation of *Salmonella* from the organs of rats has been demonstrated by Meyer and Matsumura,<sup>4</sup> Verder,<sup>5</sup> Kerrin,<sup>6</sup> Khabil,<sup>7</sup> and Hatta,<sup>8</sup> in from 0.7 per cent to approximately 13 per cent of the animals examined. In each instance these investigators studied rats obtained from a relatively small locality and, in view of the apparent ease with which infection is transmitted within colonies of these animals, a false impression of the incidence of infection in rodents as a whole might be obtained by a study of the

\* Read at a Joint Session of the Laboratory, Food, and Nutrition, and Epidemiology Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

figures presented. Furthermore, the significance of rats as vectors of food poisoning organisms similarly might be overemphasized, particularly in view of the known intermittency of excretion of the *Salmonella* organisms by infected animals. Meyer and Matsumura (*loc. cit.*) recognized the possibility of misinterpreting the incidence of *Salmonella* in rats when they point out that although Savage and Reed found an incidence of 8.5 per cent their studies were confined to a slaughterhouse. Meyer and Matsumura, on the other hand, made their studies in large districts of a growing city. In studies on the relation of virulence of *Bacterium aertrycke* and epidemic potency Topley, *et al.*<sup>9</sup> have demonstrated an apparent relationship between virulence and power of infection to spread within colonies of mice. Webster<sup>10</sup> and his coworkers, however, in a long series of carefully controlled studies describe the virulence of any single strain of *Salmonella aertrycke* as but slightly variable, considering that any single strain maintains a constant level of virulence for an indefinite period of time under the usual methods of cultivation. Topley<sup>11</sup> later showed that when susceptible mice are added continuously and at a constant rate to an infected population, the spread of in-

fection, as judged by a mortality curve, is propagated in regularly recurring waves. There is little doubt that, in laboratory studies on the infectivity of *Salmonella* for rats or mice, consideration must be given to the strain used. It will be shown later that the strain of *Salmonella enteritidis* used in this study was highly infective for both rats and mice. In contrast to these results, Kligler and Olitzki<sup>12</sup> report that rats are highly resistant to infection with *Salmonella enteritidis* and because of this massive doses and infant rats had to be used in their studies.

#### EXPERIMENTAL

To determine the longevity of *Salmonella enteritidis* in rat excreta a single animal was fed 0.5 cc. of a broth culture by stomach tube and placed with 4 normal rats for a period of 10 days. On the 10th day all feces were collected and stored in Petri dishes at room temperature. At intervals specimens of these stored feces were examined for *Salmonella enteritidis* by emulsifying 2 gm. in 10 cc. of tetrathionate broth from which decimal dilutions were made in the same medium. The broth tubes were incubated at 37° C. for 24 hours, after which bismuth sulfite agar plates were heavily streaked from the broth tubes and incubated at 37° C.

TABLE 1

*Longevity of Salmonella enteritidis in Rat Feces Stored at Room Temperature*

Amount of Feces Examined (Grams)	Days Feces Examined											
	1	10	14	21	29	50	74	92	121	148	182	189
2.0	+	+	+	+	+	+	+	+	+	+	0	0
0.2	+	+	+	+	0	+	+	+	+	+	0	0
0.02	+	+	0	0	0	0	0	+	+	0	0	0
0.002	0	0	0	0	0	0	0	0	0	0	0	0

NOTE—One rat fed 0.5 cc. 24 hr. broth culture. Fed rat caged with 4 normal rats for 10 days. On 10th day all feces collected and stored at room temperature.

METHOD OF EXAMINATION—Two grams feces emulsified in 10 cc. tetrathionate broth and decimal dilutions made in tetrathionate broth. Tubes incubated at 37° C. for 24 hrs. Bismuth sulfate agar plates streaked then incubated at 37° C. for 2 days. Suspicious colonies fished and identified biochemically and serologically.

+ = sal. ent. isolated.  
0 = negative.



for 48 hours. Suspicious colonies were isolated and identified biochemically and serologically. The results are given in Table 1.

At no time was *Salmonella enteritidis* isolated from the dilution representing 0.002 gm. of feces while in every instance *Salmonella enteritidis* was isolated from 2 gm. portions of feces up to and including the 148th day. All

specimens examined on the 182nd day were negative.

Preliminary studies had shown that extremely small inocula (*per os*) of the strain of *Salmonella enteritidis* used in this investigation were necessary to bring about infection and subsequent excretion of the organism in both rats and mice. To determine the minimum numbers of *Salmonella enteritidis* neces-

TABLE 2

Minimum Numbers of *Salmonella enteritidis* Necessary to Produce Infection in Rats and Mice by Stomach Tube Feeding

Rats									Mice										
		Excretion of <i>S. enteritidis</i> in Feces; on									Excretion of <i>S. enteritidis</i> in Feces; on								
		Days After Isolation									Days After Isolation								
Average Number Organisms	Animal Number	1	3	7	9	13	15	Number Positive	Average Number Organisms	Animal Number	1	3	7	9	13	15	Number Positive		
F e d	15 " " "	1 2 3 4	O + + +	O O + O	O O O O	O O + +	O O O O	3	F e d	1 2 3 4 5	O O O O O	O O O O +	O O O + *	Dead O Dead O Dead			4		
o n e	6 " "	5 6 7	O O O	O O +	O O O	O + O	O O O		o n e	6 7 8	+ O +	O O +	O O +	O O +	O + Dead O				
c c	" "	8 9	+ +	+ O	O O	+ O	Dead O	4	h a l *f	9 10	O O O	O O +	O O +	O + Dead Dead			5		
a m o u n t s	4 " " " "	10 11 12 13 14	+ + O O	O O O O	O O O O	O O O O	O O O O	2	c c	11 12 13 14 15	O O O O O	O Lost O *	O O O *	O O Dead Dead	+ O Dead Dead	O O Dead Dead	4		
	2 " " " "	15 16 17 18 19	O O O +	+ O O +	O O O O	O O O O	O O O O	2	a m o u n t s	16 17 18 19 20	O O O O +	O O O O +	O O O O +	O O Dead Dead Dead	O O Dead Dead Dead		5		
	1 " " " "	20 21 22 23 24	O O O +	O O O +	O O + O	O O O O	O O O O	3		21 22 23 24 25	* O O O O	Dead + O O O	Dead O O O O	Dead Dead Dead Dead	O O O O O		4		

Average number organisms—based on triplicate plate counts of amounts fed

Dead animals positive for *S. enteritidis* on autopsy

+ = Isolation of *S. enteritidis*

O = Negative

\* = No feces available

sary to bring about infection in these animals a 24 hour broth culture was diluted 10-8 and 1 cc. amounts fed by stomach tube to each of four rats. The same amount of this dilution was inoculated into dextrose agar plates in triplicate. The average plate count was 15 organisms per cc. Further dilutions of 1:2, 1:4, 1:8, and 1:16 of the 10-8 dilution were made and each dilution in 1 cc. amounts was fed to each of 5 rats. Triplicate plate counts were made of each dilution. These results are given in Table 2.

Included in Table 2 also are the results obtained on feeding 0.5 cc. amounts of the above dilutions to each of 5 mice. The mice thus received approximately half the number of organisms fed to the rats. Three of the 4 rats fed with 15 organisms (based on plate counts) were infected and one-half this amount fed to mice resulted in infec-

tion of 4 out of 5 fed. Similarly, infection was obtained in rats with dilutions of broth culture which were shown by plate counts to contain an average of one organism per cc. In mice the infecting dose averaged less than one organism per cc. Although the plate counts may not reflect the exact numbers of organisms fed these animals, these results would indicate that very few organisms of the strain of *Salmonella enteritidis* used were necessary to bring about infection in both rats and mice by stomach tube feeding.

In studying the natural transfer of *Salmonella enteritidis* in rats, 8 attempts at transfer into colonies of normal rats have been made. Five of the transfers were successful and 3 resulted in failures. For transfer purposes the animals were either infected by stomach tube feeding or by intravenous injection. After inoculation the treated ani-

TABLE 3  
*Natural Transfer of Salmonella Enteritidis in Rats*

			Positive Fecal Specimens on Days After Isolation											Agglutinin Titers
			2	3	5	6	7	8	9	10	14	21	28	
☒	Fed 100 cells													
☒	↓													
☒	☐	☒ Composite fecal specimen		+	+	+								1:320 (30 Day)
	↓													
	☒	☐	☒	→				+		+				
	↓													
	☒	☐	☒	→	+		+			+		0		1:640 (14 Day)
	↓													
	☒	☐	☒	→	+		+	+						1:80 (20 Day)
	↓													
	☒	☐	☒	→	+			0						1:80 (10 Day)
	↓													
	☒	☐	☒	→	+		+							1:80 (9 Day)
	↓													
	☒	☐	☒	→	+		+	+						1:160 (8 Day)
	↓													
	☐	☐	☐	→								0		1:40 (28 Day)
	↓													
	☐	☐	☐	→										1:40 (21 Day)

NOTE—One rat fed, by stomach tube then placed in a colony of normal rats for 7 days  
One rat was then isolated to determine infection. The other rat was placed in a new colony of normal rats  
☐ = Uninfected rat  
☒ = Infected rat  
+ = *S. enteritidis* isolated  
0 = Negative

TABLE 4

Natural Transfer of *Salmonella enteritidis* in Mice

	Examination of Fecal Specimens on Days After Isolation									
Animal Number	2	3	5	7	9	12	14	16	20	22
1	O	+	+	O	+ Dead					
2	+ Dead									
3	+	O	O	O	O Dead					
4	O	+		O		O	O	O	O	O
5	+		O	O		O	O	O Dead		
6	+		O Dead							
7	O		O	O		O	O	O	+ Dead	
8	O		O	O		O	O	O	O	O
9	O		O	O		O	O	+	O Dead	
10	+		O (Placed in a colony with 10 normal mice for 7 days)							
10			Dead							
31			+		O	O		+ Dead		
32			O		O	O		+	O	
33			+		+	C		+	+ Dead	
34			+		O	O		+ Dead		
35			+		O (Placed in a colony with 4 normal mice for 7 days)					
36			O			O Dead				
37			O		O	+ Dead				
38			O		O	O Dead				
39			O		O Dead					
40			Dead							
35	O		O Dead							
41										
42	O		O							
43	+		O (Placed in a colony with normal mice)							
44	+		O	"	"	"	"	"	"	"

NOTE—Animal number 1 injected intravenously 0.1 cc. 24 hr. broth culture  
 Infected animal caged with 9 normal mice for 7 days  
 All animals then isolated to determine infection  
 Transfer colonies 10 & 35 as above  
 + = *S. enteritidis*  
 O = Negative

mal was isolated until *Salmonella enteritidis* could be demonstrated in the excreta, following which the infected animal was placed with a group of normal animals. The colonies of normal animals varied in number from a minimum of 2 to a maximum of 10. Although one of the 3 failures occurred in a colony containing 10 animals, it is of interest that all 3 failures occurred in those colonies in which the infected animals had been injected intravenously. In each instance where the infected rat was fed by stomach tube, colony transfer of *Salmonella enteritidis* was successful. Intravenous injections consisted of 0.1 cc. of broth culture (approximately  $10^7$  organisms), while stomach

tube feeding was accomplished with approximately 100 bacterial cells in 1 cc. of salt solution. The composite feces from colonies in which transfer of infection from one infected animal to cage mates had been accomplished were examined for *Salmonella enteritidis* at intervals for 1 month before being discarded.

The results of natural transfer of *Salmonella enteritidis* through 7 rat colonies are given in Table 3.

In this experiment one rat was fed 100 bacterial cells by stomach tube, identified with dye, and placed with a colony of 5 normal rats for a period of 7 days. During this interval composite samples of excreta were examined for

*Salmonella enteritidis* by emulsifying in tetrathionate broth followed by streaking on bismuth sulfite agar. For the sake of simplicity 3 rats only in each colony are shown in the table. At the end of 7 days one of the rats in the first colony was isolated to determine whether passage had been successful, and another was placed with a fresh colony. This procedure was repeated with 9 colonies. It will be seen from the table that natural transfer occurred in 7 colonies. Both the 8th and 9th colonies failed to show *Salmonella enteritidis* in their excreta. In spite of failure to get transfer of infection in colonies 8 and 9, the blood sera of rats isolated from these colonies showed

tion and, in some instances, death, resulted in mice following stomach tube feeding, coupled with the observation that massive doses of organisms were necessary to bring about this result in rats and mice by intravenous injection, made it desirable to determine the minimum lethal dose of organisms for these animals when the latter route of injection was used. Accordingly, 100 rats and 100 mice were divided into groups of 20 each and increasing numbers of *Salmonella enteritidis* were injected intravenously in the median vein of the tail, and the number of animals dying of acute infection determined over a period of 5 days. These results are shown in Table 5.

TABLE 5

*Mortality in Rats and Mice Following Intravenous Injection of Massive Doses of Salmonella enteritidis*

Mice								Rats							
Number Animals	Number of Organisms	Mortality in Days					Total Number Dead	Number Animals	Number of Organisms	Mortality in Days					Total Number Dead
		1	2	3	4	5				1	2	3	4	5	
20	850,000,000	8	7	4	0	1	20	20	4,000,000,000	4	2	3	1	0	10
20	425,000,000	1	5	9	2	2	19	20	3,000,000,000	1	2	4	3	3	13
20	212,000,000	1	3	7	7	0	18	20	2,000,000,000	2	1	4	4	2	13
20	42,500,000	0	0	2	3	0	5	20	1,000,000,000	1	0	1	1	3	6
20	21,000,000	0	0	1	1	2	4	20	200,000,000	0	0	0	0	2	2

agglutinin titers of 1:40. Since studies of a large number of our normal laboratory rats have failed to reveal agglutinins for the *Salmonella enteritidis* strain used, a titer of 1:40 probably indicates transfer of infection in both colonies 8 and 9.

Similar studies of natural transfer of *Salmonella enteritidis* in mice have been made. The results are given in Table 4 which shows that to date only 3 colony transfers have been completed. This work, however, is being continued.

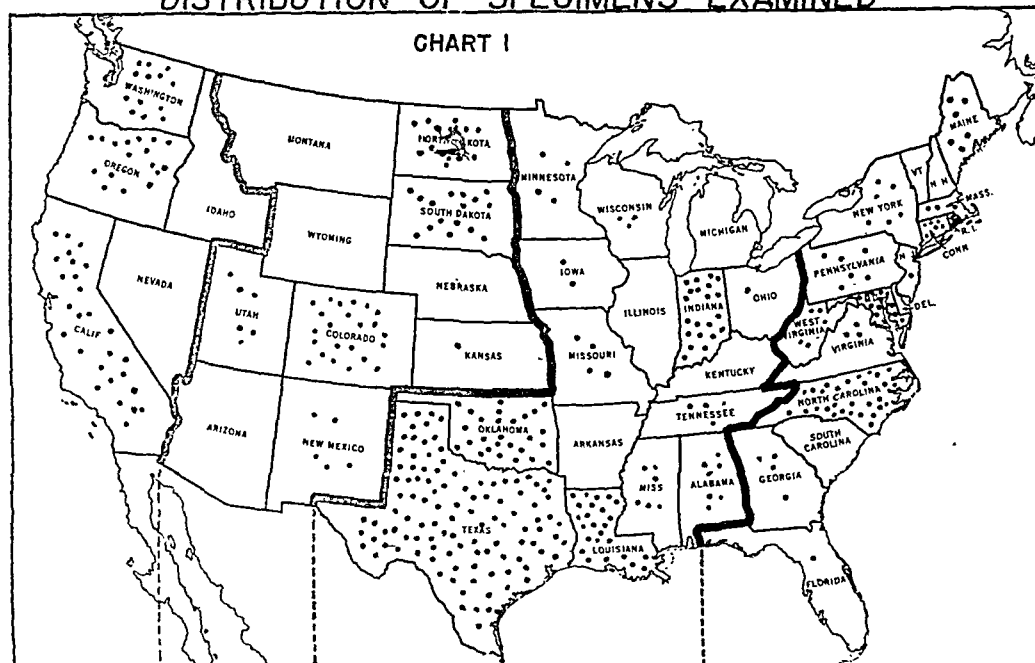
In contrast to the natural infection in rats which seemed to withstand infection with *Salmonella enteritidis* quite well, many of the mice so far studied have died shortly after becoming infected.

The relative ease with which infec-

It will be noted that more than 212 million organisms were required to cause 90-100 per cent mortality in mice and that only 65 per cent of the rats were killed with 2 billion organisms by this method of injection. Nearly 50 per cent of the mice injected with 21 million organisms lived for 28 days, while those injected with twice this number lived for 11 days. These results are in marked contrast to those obtained by feeding this organism (see Table 2). The results shown in Table 2 indicate that infinitely small numbers of organisms will infect both mice and rats and that fatalities in mice occur in 13 days or less when only approximately 7 organisms are fed by stomach tube.

To determine the incidence of *Salmonella* in rat and mice excreta col-

## DISTRIBUTION OF SPECIMENS EXAMINED



lected from widespread areas, samples have been collected throughout the United States through coöperation of the Division of Predator and Rodent Control, Fish and Wildlife Service, U. S. Department of Interior. To date, some 420 samples have been examined. The areas from which samples have been obtained and their distribution throughout the country are given in Chart 1. With each sample collected a brief history was obtained, giving the source of the material and whether a rat virus had been used in the area involved. The source of the specimens are given in Table 6.

Of the 420 specimens examined, 340 were samples of rat excreta and 80 were mice excreta. Seven samples, 1 from mice and 6 from rats, contained *Salmonella*. Two of the rat samples contained *Salmonella morganii* while a total of 5 (1.2 per cent), 1 from mice and 4 from rats, contained food poisoning types of *Salmonella*. Through the coöperation of Dr. K. M. Wheeler, Connecticut State Department of Health, Bureau of Laboratories, Hartford, Conn., and Dr. P. R.

Edwards, Kentucky Agricultural Experiment Station, University of Kentucky, Lexington, Ky., an antigenic analysis of these strains has been made. Strain 31, isolated from mouse excreta obtained in Baltimore, Md., was classi-

TABLE 6

*Sources and Numbers of Rat and Mice Pellets Examined and Number Found Positive for Salmonella*

Sources	Number of Specimens	Number Positive
Bakery	10	0
Bottling Plant	2	0
Candy Plant	66	1 (Maryland) mouse
Cotton Gin	3	0
Crab Meat Plant	2	0
Creamery	13	0
Dump	9	1 (California) rat
Farm	31	0
Field	7	0
Granary	37	0
Grocery	36	0
Home	30	0
Mdse. Store	19	0
Meat Packing Plant	29	1 (Colorado) rat
Restaurant	21	*
Warehouse	95	2 (Texas) rat
Unknown	10	0
Total	420	5
Mice 80	Rats 340	

\* 2 strains *Sal. morganii*. N. M. & Miss.

fied as *Salmonella typhimurium*; strain 151, isolated from rat excreta obtained in Grasy Horse Canyon, Calif., appeared to be *Salmonella sandiego* although because of conflicting results this strain is still being studied; strain 110, isolated from rat excreta obtained in Denver, Colo., was classified as *Salmonella* sp. (Newington type); and strains 127 and 211, both isolated from rat excreta obtained in Houston, Tex., are classified as strains of *Salmonella anatum*. As far as could be determined, rat virus had not been used in the areas from which samples of excreta containing *Salmonella* were obtained.

#### DISCUSSION

For a great many years considerable emphasis has been placed on the significance of rats and mice as vectors of food poisoning organisms of the *Salmonella* group; yet only an extremely small number of outbreaks of food infection have been established beyond reasonable doubt as traceable to rodents infected with these organisms. Although the difficulty in obtaining the necessary evidence implicating rodents in an outbreak might be caused by hazards of sampling and limitations of laboratory technic, as pointed out by Staff and Grover,<sup>13</sup> we have had little difficulty in the isolation of *Salmonella enteritidis* from the excreta of naturally infected rats and mice. These studies have shown the strain used is extremely infective for both rats and mice and that it is transmitted from infected animals to cage mates rapidly and in the absence of cannibalism. Very few organisms were required to bring about infection in rats and mice injected by stomach tube while massive doses were necessary to bring about infection and death by intravenous injection. These findings relating to stomach tube feeding are in contrast to those reported by Kligler and Olitzki (*loc. cit.*) who fed massive cultures of *Salmonella enteritidis* to

young rats to bring about infection, and concluded that rats are highly resistant to infection with this organism. We feel that undoubtedly these differences in results are related to the invasiveness or virulence of the strain of *Salmonella enteritidis* used. The particular strain used in these studies was originally isolated by Staff and Grover<sup>13</sup> from an epidemic of food poisoning involving 208 cases and 3 deaths in which infected rats had apparently contaminated a cooked cream filling for bakery products.

This investigation has shown that excreta from naturally infected rats may contain living *Salmonella enteritidis* for at least 148 days when kept at room temperature. The small number of virulent *Salmonella* organisms necessary to bring about infection in rats and mice, the ease and rapidity with which infected animals transmit the disease to cage mates in colonies, and the longevity of *Salmonella* in rat excreta cannot be correlated with the paucity of food poisoning outbreaks known to involve these animals. The results of examining some 420 specimens of rat and mice pellets, from which only 5 strains of *Salmonella* of the food poisoning type were isolated, collected throughout the country, however, might explain the dearth of food poisoning outbreaks proved to be the result of infected rodents. It is true that much higher incidences of food poisoning organisms have been reported in rats and mice, but invariably the investigators reporting such figures gathered their animals in a small area, or from a definite source, such as a packinghouse or a bakery and in several instances the studies were carried out because of a recent outbreak. Under such conditions with the apparent ease of transmission of infection in rat colonies higher incidences of infection in a given area might be expected.

Although a much larger series of specimens of rodent excreta need to be

examined from many more areas in the United States before a definite conclusion can be reached, our studies to date indicate that relatively few rodents are infected with food poisoning organisms of the *Salmonella* group. It would appear that this would explain, in part at least, the relatively few outbreaks of food poisoning in which rodents were proved to be vectors of the causative organisms. Nevertheless, since some few rats or mice may be infected with food poisoning organisms, they all must be considered potentially dangerous to health, and every effort should be made to eliminate them from establishments where human food is prepared or stored.

#### SUMMARY—CONCLUSIONS

Excreta of rats naturally infected with *Salmonella enteritidis* held at room temperature may contain living organisms for at least 148 days.

Infection of rats and mice with very few organisms is possible when a virulent strain of *Salmonella enteritidis* is fed them by stomach tube.

Transfer of infection from an infected animal to cage mates has been carried through 7 colonies with rats and through 3 colonies with mice.

A study of rat and mouse excreta collected in areas throughout the United States indicates that only a small percentage (1.2 per cent) of these animals are excreting food poisoning organisms of the *Salmonella* type.

#### REFERENCES

1. Bartram, M. T., Welch, H., and Ostrolenk, M. Incidence of Members of the *Salmonella* Group in Rats. *J. Infect. Dis.*, 67:222 (Nov.), 1940.
2. Savage, W. G., and White, P. B. Rats and *Salmonella* Group Bacilli. *J. Hyg.*, 21:258 (May), 1923.
3. Saltbe, O., and Krumwiede, C. Studies on the Paratyphoid-Enteritidis Group, VIII, An Epidemic of Food Infection Due to a Paratyphoid Bacillus of Rodent Origin. *Am. J. Hyg.*, 4:23 (Jan.), 1924.
4. Meyer, K. F., and Matsumura, K. The Incidence of Carriers of *B. Aertrycke* (*B. Pestis Caviae*) and *B. Enteritidis* in Wild Rats of San Francisco. *J. Infect. Dis.*, 41:395 (Nov.), 1927.
5. Verder, E. The Wild Rat as a Carrier of Organisms of the Paratyphoid-Enteritidis Group. *A.J.P.H.*, 17:1007 (Oct.), 1927.
6. Kerrin, J. C. *Bacillus Enteritidis* Infection in Wild Rats. *J. Path. & Bact.*, 31:588 (July), 1928.
7. Khabil, A. M. Incidence of Organisms of *Salmonella* Group in Wild Rats and Mice in Liverpool. *J. Hyg.*, 38:75 (Jan.), 1938.
8. Hatta, S. The Relations Between the *Salmonella* Group and House Rats in Tokyo City. *Jap. J. Exper. Med.*, 16:201 (July), 1938. Abst. in *Bull. Inst. Pasteur*, 37, 1131 (Nov.), 1939.
9. Topley, W. W. C., Greenwood, M., Wilson, J., and Newbold, E. M. The Epidemic Potency of Strains of *Bact. Aertrycke* of Varying Virulence. *J. Hyg.*, 27:396 (June), 1928.
10. Webster, L. T. Microbic Virulence and Host Susceptibility in Mouse Typhoid Infection. *J. Exper. Med.*, 37:231 (Feb.), 1923.
- The Virulence of an Epidemic Strain of *B. Pestis Caviae*. *Ibid.*, 37:781 (June), 1923.
- Microbic Virulence and Host Susceptibility in Paratyphoid Enteritidis Infection of White Mice. *Ibid.*, 38:33 (July), 1923.
- Microbic Virulence and Host Susceptibility in Paratyphoid Enteritidis Infection of White Mice. *Ibid.*, 38:45 (July), 1923.
- Microbic Virulence and Host Susceptibility in Paratyphoid Enteritidis Infection of White Mice. *Ibid.*, 39:129 (Jan.), 1924.
- Microbic Virulence and Host Susceptibility in Paratyphoid Enteritidis Infection of White Mice. *Ibid.*, 39:679 (June), 1924.
11. Topley, W. W. C. Some Characteristics of Long Continued Epidemics. *J. Hyg.*, 19:350 (Mar.), 1921.
12. Kligler, I. J., and Olitzki, L. Relation of External Environment to Course of a *B. Enteritidis* Infection in Mice. *Science*, 70:45 (July), 1929.
13. Staff, E. J., and Grover, M. L. An Outbreak of *Salmonella* Food Infection Caused by Filled Bakery Products. *Food Research*, 1:5 (Sept.), 1936.

# A Comparative Study of Standard Agars for Determining Bacterial Counts in Water\*\*

W. L. MALLMANN, PH.D., F.A.P.H.A., AND  
ROBERT S. BREED, PH.D., F.A.P.H.A.

*Section of Bacteriology, Michigan Agricultural Experiment Station, East Lansing,  
Mich.; and Chief, Division of Bacteriology, New York Agricultural  
Experiment Station, Geneva, N. Y.*

THE recent introduction of a new standard agar for use in milk control work frequently raises the question whether the new standard agar cannot also be used for making bacterial counts from water samples. The studies reported below give an answer to this question, based on data gathered in two quite widely separated regions. The counts quoted have been obtained from samples analyzed in the Michigan State College Laboratory at East Lansing, Mich., and from samples analyzed in the Geneva City Laboratory at Geneva, N. Y.\*

The agars compared were made with the composition and according to the methods outlined in the A.P.H.A. *Standard Methods of Water Analysis* (8th

edition) and *Standard Methods for the Examination of Dairy Products* (7th edition). For the purpose of this discussion, they are spoken of as the old † and the new ‡ standard agars. All plates were incubated for 24 hours at 37° C. in incubators that were carefully controlled to prevent variations in temperature above 37° C.

Various types of water samples were tested to obtain a composite picture representing various types of bacterial flora and varying amounts of contamination. The total number of samples examined was 654.

## EXPERIMENTAL DATA

The data for each type of water are presented in groups based on the num-

\* The authors are under obligation to Miss C. Cox of East Lansing, Mich., and Mr. R. Eglinton, City Bacteriologist of Geneva, N. Y., for having carried out the analytical work reported here.

### † Old Standard Agar

Bacto Beef Extract.....	3 gm.
Bacto Peptone . . . . .	5 "
Shredded agar . . . . .	15 "
Distilled water . . . . .	1,000 cc.
pH between 6.6 and 7.0	

### ‡ New Standard Agar (TGEM agar)

Bacto Beef Extract.....	3 gm.
Bacto Tryptone . . . . .	5 "
Glucose . . . . .	1 "
Shredded agar . . . . .	15 "
Distilled water . . . . .	1,000 cc.
pH 7.0	

10 cc. of skim milk was usually added to this agar just before final sterilization.

\*\* Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 11, 1940.



ber of colonies found on the old standard agar. Four divisions are reported, namely, (1) counts under 6, (2) counts between 6 and 10, (3) counts between 11 and 100, and (4) counts over 100. Averages are reported as the counts for each group cover a narrow band without extreme minima and maxima.

Average bacterial counts are also presented for parallel plates when one medium gave sterile plates.

The data for each type of water are presented in Tables 1 to 5 inclusive. In Tables 1 and 2 swimming pool and well waters respectively show relatively high counts on the new standard agar

when the parallel old standard agar plates failed to show colonies. Conversely, when the new standard agar plates were sterile, the counts on the parallel old standard agar plates were relatively low.

TABLE 4

*Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Raw Lake Water*

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	—	—	—
Zero on new agar	—	—	—
On old agar under 6	3	2.0	4.66
On old agar 6-10	10	7.4	9.9
On old agar 11-100	23	32.4	37.52
On old agar over 100	10	210.0	195.4

TABLE 1

*Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Swimming Pool Waters*

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	23	0	10.9
Zero on new agar	14	4.1	0.0
On old agar under 6	66	2.04	9.63
On old agar 6-10	9	7.7	7.5
On old agar 11-100	26	35.0	48.0
On old agar above 100	9	265.0	420.0

TABLE 2

*Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Well Waters*

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	52	0	17.7
Zero on new agar	21	1.0	0
On old agar under 6	156	1.25	6.7
On old agar 6-10	16	7.5	19.7
On old agar 11-100	49	34.5	63.9
On old agar over 100	17	269.0	345.0

TABLE 3

*Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Treated Lake Waters*

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	10	0	2.55
Zero on new agar	17	1.22	0
On old agar under 6	25	1.24	1.23
On old agar 6-10	4	6.0	3.32
On old agar 11-100	4	12.0	4.0
On old agar over 100	0	0	0

TABLE 5

*Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Chlorinated Sewage Effluents*

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	—	—	—
Zero on new agar	—	—	—
On old agar under 6	1	2	4
On old agar 6-10	2	9.5	14
On old agar 11-100	58	51.1	81.1
On old agar over 100	46	692.8	845.8

TABLE 6

*Distribution of Bacteria Counts on New Standard Agar When Parallel Old Standard Agar Plates were Sterile*

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
On new agar under 6	71	0	1.7
On new agar 6-10	3	0	6.0
On new agar 11-100	10	0	28.8
On new agar over 100	3	0	142.0

TABLE 7

*Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Various Types of Water*

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	87	0	14
Zero on new agar	48	0	0
On old agar under 6	319	1.2	3.14
On old agar 6-10	49	7.5	12.41
On old agar 11-100	157	31.1	50.6
On old agar over 100	52	492.5	692.5

A total of 87 samples (Table 7) gave an average of 14 bacteria per cc. on the new standard agar when the parallel old standard agar plates were sterile. In Table 6 the 87 samples are separated into 4 groups, counts under 6, counts between 6 and 10, counts between 11 and 100, and counts over 100. Seventy-one samples showed counts under 6, with an average of 1.70, but 10 samples showed an average count of 28, and 3 had an average of 128. These data are significant in demonstrating the inability of the old standard agar to develop all of the bacteria present capable of growth at 37° C. Out of 654 samples of water examined, 71, or 12.4 per cent, of the old standard agar counts would have been reported with bacteria counts of zero. In industrial applications where the absence of bacteria in a water supply is important, the use of the new standard agar is indicated.

As the number of bacteria in the waters increased, the difference in counts between the media decreased, although as shown in Table 7 the new standard agar consistently shows a higher bacteria count. The differences are not significant and would not be likely to change the sanitary or industrial rating of any water where bacteria counts are used as a measure of water quality.

#### DISCUSSION

Additional comparative data showing similar results secured from clear and contaminated water supplies with plates incubated at lower temperatures should

be studied. It is well known that more colonies develop from ordinary water samples when plates are incubated at 20° C. for 48 hours. It may well be that some of these larger counts would be increased more than others when the new standard agar is used. If so, this would give the new agar a greater differential value than the old.

The addition of skim milk to the new agar is not felt to be necessary when water samples are to be examined. In fact, some of the counts used in this work were obtained from new agar to which no milk had been added. Milk is added when the agar is used for plating milk samples only because it is unavoidably present in sufficient quantity to affect the growth of colonies wherever dilutions are 1:10 or less. In order to get comparable results from all dilutions it is necessary to add the milk in all cases where dilutions are greater than 1:10.

#### SUMMARY

Counts made from new standard agar plates were relatively high when the parallel old standard plates were sterile.

When the old standard agar plates showed counts of 5 or more colonies, parallel new standard agar plates gave higher average counts, but these were not sufficiently higher to make the differences significant.

The data indicate that the new standard agar could be substituted for the old standard agar for determining the bacterial content of water supplies without causing significant misinterpretations of data.

# Clinical Manifestations of Ariboflavinosis\*

V. P. SYDENSTRICKER, M.D.

*Professor of Medicine, University of Georgia School of Medicine, Augusta, Ga.*

SINCE the signs of riboflavin deficiency in human beings have been identified, it has become evident that this avitaminosis is exceedingly common and that its recognition is quite important in estimating the nutritional state. The facial and labial lesions of ariboflavinosis contribute largely to the typical facies of classic pellagra and with glossitis constitute the picture of "pellagra sine pellagra." Stannus<sup>1</sup> in 1912 described "angular stomatitis" associated with glossitis as "pellagra fruste." Goldberger and his collaborators<sup>2, 3</sup> noted the labial lesions and facial seborrhea occurring in the absence of typical dermatitis and suspected the influence of two distinct dietary factors in pellagra. Many other observers have described similar types of localized dermatitis of the face with "perleche" and glossitis curable with yeast.<sup>4-6</sup> Moore<sup>8</sup> found that nicotinic acid did not cure this syndrome but that autoclaved yeast was effective and concluded that deficiency of some other factor than nicotinic acid was the cause. Ocular disturbances in association with sore tongue, sore mouth, inflammation of the nasal mucosa, and at times dermatitis of the genitalia have been stressed by observers in the tropics for a century.<sup>9-11</sup>

Moore<sup>8, 11, 12, 13, 14</sup> has described this syndrome in detail; his illustrations show that the facial and oral lesions are typical of ariboflavinosis.

It is recognized that beriberi and pellagra are major syndromes of B group avitaminosis resulting from prolonged subtotal deficiency of the whole B complex. The factors contributing to the development of endemic ariboflavinosis are probably identical. A diet containing a marked excess of carbohydrate over the amount of vitamin necessary for the utilization of the energy derived from it is most important. Defects in absorption, storage, and utilization of the vitamins are almost equally effective. Increased metabolic requirement in the sense of increased derivation of energy from carbohydrate, in the presence of a relatively fixed vitamin intake, is a common source of disease. Vomiting, diarrhea, and edema of the gastrointestinal tract are frequent causes of poor absorption; hepatic disease seems to be an important factor in failure of storage and utilization. Unusual physical exertion, pregnancy, fever, hyperthyroidism, alcoholism, and therapeutic administration of large amounts of dextrose intravenously are common causes of increased utilization of energy. Aside from dietary selection, the factors which determine the predominant avitaminosis in a given case are often obscure.

Thiamin, nicotinic acid, and riboflavin are components of coenzymes essential to the intermediate metabolism of carbohydrate, when any one of the three vitamins is exhausted from failure of replacement, or possibly when there is a marked failure of balanced intake of the three, a complex disturbance of carbohydrate metabolism results. In addition to coenzyme activity at various stages of the dehydrogenation of hexoses, riboflavin is the active fraction of the yellow respiratory ferment of Warburg. The processes of intracellular respiration are dependent on it and it is thought to be ubiquitous in living cells. Because of its multiple functions it is not surprising that deficiency of riboflavin should be frequent and that the manifestations of deficiency should be varied. There is evidence that other vitamins of the B group have a definite influence on the utilization of riboflavin. Very frequently the administration of large amounts of nicotinic acid to pellagrins maintained on an inadequate diet causes the rapid development of signs of ariboflavinosis after the cure of typical pellagrous glossitis and dermatitis.<sup>15</sup> This phenomenon suggests that the biochemical activity of nicotinic acid involves the utilization of riboflavin, there being as yet no clinical evidence that the converse is true. In certain cases of ariboflavinosis, treatment with riboflavin produces only partial cure of cheilosis and superficial vascular keratitis, the addition of vitamin B6 causes rapid completion of healing.<sup>10</sup> In other instances cure of cheilosis typical of riboflavin deficiency has been brought about by the administration of vitamin B6 alone.<sup>17</sup> There is reason to believe that vitamin B6 mobilizes riboflavin from storage or dissociates it from some combination which is not physiologically active.<sup>10</sup> Pantothenic acid may have a similar action.<sup>16, 18</sup>

Almost nothing is known of the

pathology of ariboflavinosis. Lesions of the skin and mucous membranes may be due to local disturbances of cellular nutrition and respiration. Changes in the eyes are best explained as compensatory phenomena to local cellular anoxemia. Bessey and Wolbach<sup>19</sup> suspected that vascularization of the cornea was such a response, they suggested that the normal respiration of the avascular corneal tissues depends on the transport of oxygen from the epithelium to the deeper layers by riboflavin. In the absence of an adequate supply of the vitamin in the cells of the cornea, anoxemia results and capillaries invade the tissues to supply oxygen directly from erythrocytes. It is likely that there is etiological as well as apparent similarity between the fatty infiltration of the liver which occurs in animals deprived of riboflavin and the fatty liver of fatal pellagra.<sup>20, 21</sup> Anemia is much less frequent in ariboflavinosis than in pellagra and there is no anemia from lack of the vitamin when the diet contains an adequate amount of iron.<sup>22</sup> Gastric achlorhydria has been present in approximately 50 per cent of personally observed instances of ariboflavinosis but apparently has not the direct relation to this syndrome that it has to endemic pellagra. It may have much influence on the riboflavin requirement of the individual and on the tendency to relapse.

#### SYMPTOMS AND SIGNS OF RIBOFLAVIN DEFICIENCY

The symptoms of riboflavin deficiency are numerous and many are common to all avitaminoses. Nervousness, irritability, anorexia, gastric discomfort, and ready fatigue are entirely nonspecific and probably are the result of multiple deficiencies. Soreness of the lips and tongue and dysphagia from tenderness of the tongue and fauces are characteristic. There is not the sensitiveness to hot or highly seasoned food that is

present in nicotinic acid deficiency, nor is there the severe dysphagia due to esophagitis. Pruritus of the vulva or scrotum may be present. In more than half the cases of ariboflavinosis which we have observed, ocular symptoms have preceded any others, they have been present at some time in over 90 per cent. Photophobia, burning and itching of the eyes, a sensation of eye-strain or rapid visual fatigue, poor distant vision and blurred vision in poor light or twilight are specific symptoms. Occurring in the absence of gross refractive error or conjunctival infection, they are highly suggestive of ariboflavinosis. The similarity of these complaints to those occurring in vitamin A deficiency has led to much confusion in their interpretation.<sup>23, 24</sup>

The physical signs of ariboflavinosis are specific and there is a rich experimental background for their correlation with lesions produced in various species of animals. No observer had separated them from the syndrome of endemic pellagra prior to the report of Sebrell and Butler<sup>25</sup> on the lesions occurring in a group of patients maintained on an experimental diet exceedingly poor in riboflavin but well supplemented with other vitamins. Under the conditions of their experiment the first sign to appear was cheilosis. There was maceration at the commissures of the lips with redness and some desquamation of the lips along the line of closure. Redness spread to the buccal surfaces of the lips, fissures developed at the commissures. Mild seborrheic dermatitis occurred in the nasolabial folds, on the alae nasi, and occasionally on the ears and eyelids. Later observations have shown that fissures of the commissures of the eyelids may develop, and that indolent ulcerations of the nasal septum are not infrequent, fissures sometimes occur on either side of the septum at the nasal orifices. The secretion of the sebaceous glands of the face seems to be altered

so that inspissated, almost hair-like comedones are apt to develop over the forehead, malar eminences, nose and chin—this “shark-skin eruption” frequently has been emphasized in the description of classic pellagra. The tongue becomes clean, the papillae flattened or mushroom-shaped rather than atrophic as in nicotinic acid deficiency. The color of the tongue is characteristic, the normal pink is replaced by a purplish-red or magenta quite different from the scarlet of nicotinic acid deficiency.<sup>26, 27</sup> The color and texture of the tongue are important in differentiating ariboflavinosis from nicotinic acid deficiency. In addition to localized seborrheic lesions of the face and ears, generalized seborrheic dermatitis may be a manifestation of riboflavin deficiency; we have seen 4 patients in whom extensive seborrhea healed without local treatment during the administration of riboflavin for the cure of coincident specific oral and ocular lesions. More rarely dry, brown, itching dermatitis of the hands and scrotum or vulva present in patients with typical cheilosis and glossitis has healed during treatment instituted for typical signs of riboflavin deficiency. The specific nature of such dermatoses is yet to be determined.

#### OCULAR MANIFESTATIONS

The ocular manifestations of riboflavin deficiency are of special interest and importance. There have been many references to the occurrence of visual disturbances in association with signs now known to be due to ariboflavinosis. Time does not permit discussion of the extensive experimental work of Day and his collaborators,<sup>28-33</sup> of O'Brien,<sup>34</sup> and others. For years it has been known that so-called ophthalmia as well as cataract could be produced in rats by a diet deficient in the heat stable fraction of yeast. Bessey and Wolbach<sup>10</sup> first used the slit lamp to study the

progress of ocular changes in rats deprived of riboflavin, and followed their observations during life with india-ink injection and histological examination post-mortem. They found that superficial vascularization of the cornea was the earliest sign of riboflavin deficiency. As avitaminosis progressed, superficial and interstitial nebulae developed in the cornea, later there was invasion of the deeper layers by newly formed capillaries until extensive vascular networks were produced. The process could be arrested at any time by the administration of riboflavin, new vessels rapidly became empty of blood but remained visible for many months. These observations were confirmed in all essential details by the almost simultaneous report of Eckardt and Johnson.<sup>35</sup> The majority of clinical students of nutritional disease have been impressed with the prevalence of ocular complaints in patients presenting evidence of B group vitamin deficiency. Reference has been made to numerous observers in the tropics. Spies, Vilter, and Ashe<sup>23</sup> noted histories of visual impairment or burning of the eyes associated with conjunctivitis or mydriasis in 70 per cent of their patients. Spies studied a group of 50 patients with ocular complaints.<sup>24</sup> While these observers were inclined to attribute the symptoms and signs to vitamin A deficiency, they noted that a number of patients were relieved by the administration of riboflavin. Pock-Steen<sup>36</sup> gave an accurate description of ocular symptoms occurring in a rather large group of patients with sprue. This author suspected that they might be due to riboflavin deficiency and was able to secure rapid cure with small amounts of the vitamin in over 90 per cent of cases.

During the past year and a half our group has paid special attention to the ocular complaints of patients with oral signs of ariboflavinosis and to the ex-

amination with a slit lamp of their eyes at various stages in the development of mouth and skin lesions, as well as during periods of treatment. Many of these individuals were allowed to relapse after cure had been effected with riboflavin. Corneal vascularization was found to be constantly present when other signs of ariboflavinosis could be recognized except in a few patients with marked arcus senilis. All grades of vascularization were observed, and it seems possible to reconstruct the whole sequence of events from the many fragments of the picture. At the same time we studied the eyes of a group of apparently normal persons who complained only of visual disturbances, particularly photophobia, ocular fatigue, and dim vision not improved by correction of refractive errors. Among these were seen the earliest stages of corneal vascularization as well as several well advanced instances of keratitis. Mydriasis and defects of accommodation were common in this group and probably contributed to the symptoms of photophobia and poor distant vision.<sup>27, 37</sup>

The earliest and most frequent sign of ariboflavinosis is slight circumcorneal congestion, frequently visible with a hand lens or ophthalmoscope before it can be seen by the unaided eye. In such cases the slit lamp shows proliferation and marked congestion of the limbic plexus; there are many newly formed capillaries which obliterate the normal avascular zone between the plexus and the sclero-corneal junction. Each scleral digitation is apt to be outlined by capillaries which form a more or less complete arcade but do not yet encroach on the cornea. Within a few days, sometimes only one or two, empty capillaries can be seen sprouting from the apices of the loops of the limbic arcade; these "sprouts" lie just beneath the epithelium and grow centripetally; in from 2 to 4 days clumps of red blood cells circulate through them making

irregular, jerky progress; at this stage the deeper efferent limb of the loop cannot be clearly seen. Such vessels tend to grow rapidly and form anastomoses with adjacent capillaries to form a secondary arcade lying within the cornea. From this, secondary capillary sprouts develop and grow centripetally, anastomosing freely until an extensive superficial plexus is formed which may cover the peripheral two-thirds of the cornea. Much later, deeper vessels, which invade the substantia propria at all levels, spring from the limbic plexus, and eventually a scanty posterior plexus may be formed which lies just proximal to Descemet's membrane. It seems characteristic of the keratitis of ariboflavinosis that vascularization is predominantly anterior. In long standing cases which have undergone repeated relapses, very extensive corneal vascularization may be seen with large vessels at all levels, but a posterior plexus is never prominent. Early in some cases, but usually after prolonged deficiency, diffuse nebulae develop at various levels; quite frequently there are fine superficial punctate opacities. A few patients with extensive vascularization had large scars, almost certainly the result of corneal ulcers.

The response of nutritional keratitis to treatment has been prompt and often spectacular. The stage of congestion and proliferation of the limbic plexus was identified as a sign of deficiency only after the plexus had been seen to return to a normal state after the administration of riboflavin. Depending on the extent of vascularization and the size of the vessels present, it may require from 2 to 10 days for occlusion to occur. Large vessels, the result of very chronic deficiency or complicating corneal ulcers, may never become occluded. The first evidence of healing is interruption of the columns of blood in the capillaries producing a "beaded" appearance; 2 or 3 days later the vessels

are empty or contain scattered clumps of red cells which are stationary and eventually disintegrate. The empty vessels remain visible for at least a year. Nebulae resolve slowly, often requiring 3 weeks for absorption.

Recently Johnson and Eckardt<sup>38</sup> reported the cure of rosacea keratitis in 32 of 36 patients treated with riboflavin; in 9 cases cutaneous rosacea was also present. These authors did not mention the incidence of oral lesions of ariboflavinosis but did note the similarity of the corneal vascularization to that observed in rats with experimental riboflavin deficiency. It is quite likely that the syndrome designated "rosacea" by dermatologists and ophthalmologists would be called ariboflavinosis by an observer interested in nutritional disease.

Iritis has been seen in 5 instances where keratitis and cheilosis were present, in each case iritis subsided during treatment with riboflavin. Accumulations of pigment, probably of pigment bearing wandering cells, on the anterior surface of the iris was observed in 24 of our patients. On grey irises this pigment occurred in irregular clumps which we cannot distinguish from "hazel spots"; brown irises have a shaggy, smoothed-out appearance due to veiling of the normal architecture. Such pigmentation was recognized as abnormal only after it was seen to disappear during treatment.

The amount of riboflavin required for satisfactory treatment in any case is conditioned by the adequacy of the diet which can be furnished and by the ability of the patient to extract dietary riboflavin from food sources. Under experimental conditions with a diet extremely poor in the vitamin, 5 mg.\* daily has been the average dose required

---

\* Riboflavin employed in our investigations has been the pure crystalline synthetic vitamin furnished by Merck & Co., E. R. Squibb & Sons, and the Winthrop Chemical Co. Riboflavin-sodium for injection was furnished by Merck & Co.

for rapid cure, in the presence of diarrhea, irreversible gastric achlorhydria or severe hepatic disease, 10 or even 15 mg. a day may be required when given by mouth. Under uncontrolled conditions with a tolerably adequate diet, 3 mg. daily is adequate for cure and maintenance of the great majority of patients. In extremely depleted patients with polyavitaminosis of severe grade, 10 mg. daily of riboflavin-sodium given intravenously is not an excessive amount.

It is almost superfluous to say that dietary treatment should never be neglected. Ariboflavinosis is the syndrome of "pellagra sine pellagra" and though the distinctive manifestations may be those of riboflavin deficiency alone, B group deficiency probably exists in every instance. Dietary habits, economic stress, or coincident disturbance of the gastrointestinal apparatus may determine the predominant avitaminosis.

When it can be administered and digested, the usual 60 to 90 gm. daily ration of yeast curative for pellagra contains ample amounts of riboflavin as well as the other vitamins needed for adequate nutrition. It is doubtful whether riboflavin should be given over long periods without making sure that other members of the B group are supplied by food, by yeast or the pure vitamins.

The recognition of ariboflavinosis as a syndrome is of much interest, it is of even more importance. Early corneal vascularization is visible with a slit lamp before any gross signs such as cheilosis or glossitis have developed. This method of examination is probably the most delicate test available for deficiency of the B group of vitamins.

#### SUMMARY

Since the signs of "pellagra sine pellagra" have been shown to be due to deficiency of riboflavin in the diet, it has become possible to correlate many

observations on nutritional disease which have seemed contradictory. Ariboflavinosis, like pellagra and beriberi, is a manifestation of B group avitaminosis. The specific signs probably result from a complex disturbance of the coenzyme functions of the B vitamins as a group, to which is added failure of the activity of riboflavin in intracellular oxidation.

Riboflavin deficiency is characterized by photophobia and dimness of vision at a distance and in dim light; cheilosis, seborrheic lesions about the ears and nose, and a specific sort of glossitis. Examination of the eyes may show mydriasis and defects of accommodation. The earliest and most constant finding is a superficial vascularization of the cornea. This may progress to severe interstitial keratitis. Therapeutic tests have shown that rosacea keratitis also is due to deficiency of riboflavin. A few patients with syphilitic keratitis have shown remarkable improvement during the administration of this vitamin.

Recognition of the early ocular signs of riboflavin deficiency offers an easy method of identifying B group avitaminosis at a stage when no gross signs are present.

#### REFERENCES

1. Stannus, H. S. Pellagra in Nyasaland. *Tr. Soc. Trop. Med. & Hyg.*, 5:112, 1912.
2. Goldberger, J., and Tanner, W. F. A Study of the Pellagra-preventive Action of Dried Beans, Casein, Dried Milk and Brewer's Yeast with a Consideration of the Essential Preventive Factors Involved. *Pub. Health Rep.*, 40:54, 1925.
3. Goldberger, J., Wheeler, G. A., and Sydenstricker, E. A Study of the Diet of Non-pellagrous and of Pellagrous Households in Textile Mill Communities in South Carolina in 1916. *J.A.M.A.*, 71:944, 1918.
4. Wright, E. J. Disease Due to A and B Avitaminosis in Sierra Leone. *West African M. J.*, 2:127, 1928.
5. Fitzgerald, G. H. An Outbreak of Exfoliative Glossitis in an Assam Jail. *Indian M. Gaz.*, 67:556, 1932.
6. Landor, J. V., and Pallister, R. A. Avitaminosis B<sub>2</sub>. *Tr. Roy. Soc. Trop. Med. & Hyg.*, 29:121, 1935.
7. Aykroyd, W. R., and Crishnan, B. G. Stomatitis Due to Vitamin B<sub>2</sub> Deficiency. *Indian J. M. Res.*, 24:411 (Oct.), 1936.
8. Moore, D. F. Retrobulbar Neuritis with Pellagra in Nigeria. *J. Trop. Med. & Hyg.*, 42:109 (Apr. 15), 1939.



9. Clarke, R.; cited by Leitch, J. N. *Dietetics in Warm Climates*. London, Harrison, 1930, p. 368.
10. Strachan, H.; cited by Leitch, J. N. *Dietetics in Warm Climates*. London, Harrison, 1930, p. 368.
11. Moore, D. F. Partial Loss of Central Acuity of Vision for Reading and Distance in School Children and Its Possible Association with Food Deficiency. *West African M. J.*, 3:46, 1930.
12. Moore, D. F. Nutritional Retrobulbar Neuritis Followed by Partial Optic Atrophy. *Lancet*, I:1225 (May 22), 1937.
13. Moore, D. F. Pellagra or Pellagra-like Conditions in Association with Deficiency of Vitamin A. *J. Trop. Med. & Hyg.*, 43:190 (July 15), 1940.
14. Moore, D. F. Personal communication.
15. Schmidt, H. L., Jr., and Sydenstricker, V. P. Nicotinic Acid in the Prevention of Pellagra. *J.A.M.A.*, 110:2065 (June 18), 1938.
16. Singal, S., Briggs, A. P., and Sydenstricker, V. P. Unpublished observations.
17. Smith, S. G., and Martin, D. W. Cheilosis Successfully Treated with Synthetic B<sub>6</sub>. *Proc. Soc. Exper. Biol. & Med.*, 43:660 (Apr.), 1940.
18. Spies, T. D., Stanberry, S. R., Williams, R. J., Jukes, T. H., and Babcock, S. H. Pantothenic Acid in Human Nutrition. *J.A.M.A.*, 115:523 (Aug. 17), 1940.
19. Bessey, O. A., and Wolbach, S. B. Vascularization of the Cornea of the Rat in Riboflavin Deficiency, with a Note on Vascularization of the Cornea in Vitamin A Deficiency. *J. Exper. Med.*, 69:1 (Jan.), 1939.
20. Field, H., Jr., and Wise, E. C. Fatal Probable Riboflavin Deficiency in Man. *J. Clin. Investigation*, 18:474 (July), 1939.
21. Kisch, F. Vitamin B<sub>2</sub> (Lactoflavin) in der Behandlung funikularer Myelose bei Perniziöser Anämie. *Wien. med. Wchnschr.*, 87:194 (Feb. 13), 1937.
22. Sebrell, W. H., and Butler, R. E. Riboflavin Deficiency in Man (Ariboflavinosis). *Pub. Health Rep.*, 54:2121 (Dec. 1), 1939.
23. Spies, T. D., Vilter, R. W., and Ashe, W. F. Pellagra, Beri-beri and Riboflavin Deficiency in Human Beings. *J.A.M.A.*, 113:931 (Sept. 2), 1939.
24. Spies, T. D. A Note on the Ocular Symptoms and Signs Occurring from Malnutrition in Human Beings. *Am. J. M. Sc.*, 198:40 (July), 1939.
25. Sebrell, W. H., and Butler, R. E. Riboflavin Deficiency in Man, a Preliminary Note. *Pub. Health Rep.*, 53:2282 (Dec. 30), 1938.
26. Jolliffe, N., Fein, H. D., and Rosenblum, L. A. Riboflavin Deficiency in Man. *New England J. Med.*, 221:921 (Dec. 14), 1939.
27. Kruse, H. D., Sydenstricker, V. P., Sebrell, W. H., and Cleckley, H. M. Ocular Manifestations of Ariboflavinosis. *Pub. Health Rep.*, 55:157 (Jan. 26), 1940.
28. Day, P. L., Langston, W. C., and O'Brien, C. S. Cataract and Other Ocular Changes in Vitamin G Deficiency; Experimental Study on Albino Rats. *Am. J. Ophth.*, 14:1005 (Oct.), 1931.
29. Langston, W. C., and Day, P. L. Nutritional Cataract in the Norway Rat. *South. M. J.*, 26:296 (Feb.), 1933.
30. Langston, W. C., Day, P. L., and Cosgrove, K. W. Cataract in the Albino Mouse Resulting from a Deficiency of Vitamin G (B<sub>2</sub>). *Arch. Ophth.*, 10:508 (Oct.), 1933.
31. Day, P. L., and Langston, W. C. Further Experiments with Cataract in Albino Rats Resulting from the Withdrawal of Vitamin G (B<sub>2</sub>) from the Diet. *J. Nutrition*, 7:97 (Jan.), 1934.
32. Langston, W. C., and Day, P. L. Arrest of Nutritional Cataract in Albino Rats by the Use of Vitamin G (B<sub>2</sub>). *South. M. J.*, 27:170 (Feb.), 1934.
33. Day, P. L., Darby, W. J., and Langston, W. C. Identity of Flavin with the Cataract-preventive Factor. *J. Nutrition*, 13:289 (Apr.), 1937.
34. O'Brien, C. S. Experimental Cataract in Vitamin G Deficiency. *Arch. Ophth.*, 8:880 (Dec.), 1932.
35. Eckardt, R. E., and Johnson, L. V. Nutritional Cataract and Relation of Galactose to Appearance of Senile Suture Line in Rats. *Arch. Ophth.*, 21:315 (Feb.), 1939.
36. Pock-Steen, P. H. Eye Symptoms in Patients with Leiodystonia and Sprue: Aknephaskopia. *Geneesk. tijdschr. v. Nederl.-Indië*, 78:1986 (Aug. 8), 1939.
37. Sydenstricker, V. P., Sebrell, W. H., Cleckley, H. M., and Kruse, H. D. The Ocular Manifestations of Ariboflavinosis. *J.A.M.A.*, 114:2437 (June 22), 1940.
38. Johnson, L. V., and Eckardt, R. E. Rosacea Keratitis and Conditions with Vascularization of Cornea Treated with Riboflavin. *Arch. Ophth.*, 23:899 (May), 1940.

# Determination and Characterization of Coliform Bacteria from Chlorinated Waters\*

MAX LEVINE, PH.D., F.A.P.H.A.

*Professor in Charge, Department of Bacteriology, and Bacteriologist, Engineering Experiment Station, Iowa State College, Ames, Ia.*

THE term "coliform" was suggested by Breed and Norton to include those aerobic facultatively anaerobic Gram-negative non-spore-forming organisms which ferment lactose with gas formation. The term "coliform" might, however, be considered to connote all organisms which resemble *Escherichia coli* morphologically. In view of the fact that the term was first suggested for application in the field of water bacteriology where only the 37° C. temperature of incubation is employed, gasification at this high temperature is implied. The question naturally arises as to whether organisms which produce gas from lactose only slowly or not at all at 37° C. but vigorously at lower temperatures (20° to 30° C.) are to be included in the "coliform" group. In this communication the term "coliform group" will be employed, as suggested by Stuart, Mickle, and Borman, to include all non-spore-forming Gram-negative bacteria irrespective of the temperature at which gas is produced from lactose.

Heterogeneity of the coliform group coupled with repeated observations that certain types appeared to be associated

with specific sources, though this association is not generally a perfect one, holds forth the hope of detection, eventually, of a high degree of correlation between the incidence of certain coliform types and sanitary significance. Numerous criteria have been suggested for the differentiation of coliform organisms with a view to the detection of such types. Among these criteria are included (1) ability to ferment various carbohydrates; (2) the nature of the products produced in the dissimilation of glucose, such, for example, as the relative quantities of acid, hydrogen, carbon dioxide, and acetylmethylcarbinol; (3) the production of hydrogen sulfide and indol from appropriate nitrogenous media; (4) the availability of citric and other organic acids as sources of carbon, or (5) uric and other nitrogenous compounds as sole sources of nitrogen; and (6) attention is being particularly called to the importance of the effect of temperature on the dissimilative properties and growth of this group of bacteria.

Of the numerous differential reactions studied, several have become generally recognized as particularly useful. These include indol, the methyl red test, the Voges-Proskauer reaction and citrate utilization (for which Parr succinctly suggested the term "I.M.V.i.C" reac-

---

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 11, 1940.

tions) to which should now be added temperature relationships.

The indol test has long been considered of fundamental significance. Thus the English have repeatedly called attention to the importance of the indol positive varieties in interpretation of water analyses and the recommendation of the Eijkman test by the German bacteriologists, since the high temperature of incubation eliminates, for the most part, the indol-negative strains, also serves to emphasize the sanitary significance of the indol-positive strains. The greatest objection to the indol test has been its cumbersomeness. The old technic for detection required incubation periods of 5 days or longer, and the test reagents were not as specific as desirable. The introduction of tryptophane broth and such technics as the Goré test and Kovac's reagent have made it possible to detect indol in 24 hour cultures. This reaction may well resume its former prominence and significance.

The methyl red reaction is the resultant of the rate of acid production, the maximum acidity produced and acid utilization, in a suitably buffered medium. The temperature of incubation, concentration of nutrients, and period of incubation, are all vital for reliable and duplicable results. It is based on the following principle as pointed out by Clark and Lubs. If the amount of glucose in a medium is restricted to that quantity necessary to yield the limiting (inhibiting) hydrogen ion concentration for *Escherichia coli* the acidity resulting from growth of *Aerobacter aerogenes* in the same medium would necessarily be below that required for inhibition since the latter organism produces considerably less acid per unit weight of glucose decomposed. On prolonged incubation in such a medium the *Escherichia* strains would produce a high permanent acidity, whereas cultures of *Aerobacter* would continue to

grow, eventually exhausting the available sugar and decomposing the intermediate acid products to carbonates and bicarbonates, with the result that the cultures become progressively more alkaline. In a carefully stipulated medium at a temperature of 30° C. an incubation period of 5 days was found necessary by Clark and Lubs for dependable differentiation—the *Escherichia* strains remaining acid whereas the *Aerobacter* strains became alkaline to the indicator methyl red. The tendency of water bacteriologists to disregard the limitations stipulated by Clark and Lubs for the determination of this reaction has lead to considerable confusion in the literature.

We have on numerous occasions observed cultures which were acid to methyl red at 37° C. in 3 or 4 days, whereas they were distinctly alkaline when incubated for the same period at 30° C. Stuart, Mickle, and Borman report many strains which are alkaline to methyl red at 20° C. but acid at 37° C. It is not surprising, therefore, that many nonconforming cultures (as respects the anticipated reaction to methyl red on the basis of other characteristics observed) have been reported which would have been considered standard strains were it not for the idiosyncrasies of the investigator.

The recommendation in the 8th edition of the *Standard Methods of Water Analysis* for the determination of the methyl red test after 3 or 4 days at 37° C. is conducive to the suppression of the number of methyl red alkaline reactions, with the result that *Aerobacter* strains are erroneously allocated to the *Escherichia* or intermediate sections.

Because of the confusion in the literature due to the frequent disregard of the influence of temperature and the period of incubation on the methyl red test, it is suggested that this differential criterion might well be dispensed with,

particularly when employing the Voges-Proskauer reaction with which it shows such a high degree of correlation when the two tests are properly performed.

The Voges-Proskauer reaction, which consists of the determination of the presence of acetylmethylcarbinol, is generally accepted as a particularly important criterion for differentiation of the *Aerogenes* from the *Escherichia* sections. The 8th edition of the *Standard Methods of Water Analysis* recommends the addition of 10 per cent potassium hydroxide to Difco V.P. broth cultures incubated for 24 to 48 hours at 37° C. Recently, Barritt (1936) suggested a technic consisting of the addition of 0.6 cc. of 5 per cent alpha naphthol in absolute ethyl alcohol and 0.2 cc. of 40 per cent potassium hydroxide per cc. of culture medium as a more delicate reagent for the detection of acetylmethylcarbinol.

Observations on several hundred coliform bacteria indicated the marked influence of temperature of incubation and test reagent on the frequency of detection of strains which are positive to the Voges-Proskauer test. The results are summarized in Table 1.

TABLE 1

*Effect of Temperature and Test Reagent on V.P. Reactions of 221 Coliform Strains*

Incubation	→	24 Hours	48 Hours
Test Reagent		No. Positive at 37° C.	
10% KOH		21	26
$\alpha$ -Naphthol		44	44
		No. Positive at 30° C.	
10% KOH		45	48
$\alpha$ -Naphthol		51	51

Considering first, the effect of the test reagent, it will be noted that a great many more positive reactions were detected with the  $\alpha$ -naphthol than with potassium hydroxide. It will be noted further, that the number of positive reactions was greater when incubation was at 30° C. than was the case at the

higher temperature of 37° C. and that this was particularly true when employing potassium hydroxide as the test reagent. At 37° C. 44 positive Voges-Proskauer tests were obtained with the  $\alpha$ -naphthol reagent as compared to 21 positive reactions with the Standard Methods technic (employing 10 per cent potassium hydroxide) after an incubation period of 24 hours, and the number of positive reactions rose but slightly, to 26, when the incubation period was prolonged to 48 hours.

At the lower temperature (30° C.), 51 positive strains were detected by the  $\alpha$ -naphthol reagent as compared with 45 after 24 hours, and 48 at 48 hours' incubation when employing the potassium hydroxide reagent.

It is quite evident that the  $\alpha$ -naphthol reagent is a more delicate indicator for acetylmethylcarbinol than is the Standard Methods technic and that the differences are particularly marked at the high temperature (37° C.) of incubation. The Standard Methods technic is therefore conducive to the suppression of the number of positive Voges-Proskauer tests so that the results obtained tend to allocate strains that should be considered in the *Aerobacter* section to the *Escherichia* or "Intermediate" sections.

With such cultures as we have had occasion to observe, employing temperatures of 30° and 37° C., no differences in their ability to utilize citrate were noted. Stuart, Mickle, and Borman note, however, that a number of their strains utilized citrate as a sole source of carbon at 20° C. but not at 37° C.

There have been numerous reports in the past decade on what are referred to as "slow lactose fermenters" or preferably "aberrant" strains. Some water analysts are inclined to disregard these, particularly if less than 5 per cent (or even 10 per cent) gas is formed after 48 hours at 37° C. Many such aberrant coliform strains produce goodly quanti-

ties of gas at lower temperatures (20° to 30° C.) and in some of the suggested presumptive test media even at the higher temperature of 37° C.

TABLE 2

*Gas Production by 92 Strains of "Slow" Lactose Fermenters Isolated from Chlorinated Waters*

Medium	Producing 10 Per cent or More Gas at 37° C. in 48 Hours	
	Number	Per cent *
Lactose Broth	0.0	0.0
Lauter-Dominick	44	48
MacConkey Broth	52	57
Brilliant Green		
Bile (2%)	50	54
Brilliant Green		
Bile (5%)	52	57
Neutral Red	64	70
Formate		
Ricinoleate Broth	71	77

\* Per cent in round numbers

From Table 2 it will be noted that of 92 strains which produced less than 10 per cent gas in standard lactose broth in 48 hours at 37° C. (all of these were vigorous gas formers at 30° C.), about 52 (57 per cent) of the strains produced 10 per cent or more gas at 37° C. in MacConkey broth and brilliant green bile. An even larger proportion, 70 to 77 per cent, produced goodly amounts of gas from neutral red and formate ricinoleate broth. The results illustrate that constituents of the medium (other than lactose) as well as temperature may influence the lactose dissimilating activities of an organism and are also illustrative of the difficulties encountered in characterizing what is meant by the term "slow lactose fermenter."

The question as to the origin of these "slow lactose fermenters" is a moot one. It may be significant to note that up to the present we have encountered them almost exclusively in water during the summer season.

Stuart, Mickle, and Borman suggest the term "micro-aerogenic coliforms"

for those strains which produce only a small amount of gas at both 37° C. and 20° C. They feel that such cultures, which might be considered to be the "true slow lactose fermenters," probably have the same sanitary significance as the more typical coliform organisms.

For those strains which ferment lactose poorly at 37° C. but are vigorous gas formers at the lower temperature (20° C.), they suggest the term "pseudo - micro - aerogenic coliforms." They consider this latter group of no sanitary significance because they did not obtain a single culture falling into this category from 600 fecal specimens examined, nor did they encounter an organism of this type which could be allocated to the genus *Escherichia* in a study of more than 10,000 coliform organisms from various sources.

From a study of 196 coliform strains isolated from chlorinated water, 113 produced more than 10 per cent gas at 37° C., and are considered to be normal coliform strains, whereas 83 fell into the category of "aberrant coliform" bacteria. Allocation of 189 of these strains, for which data are available; among the sections of coliform bacilli and their reactions with respect to indol, is indicated in Table 3. Of these aberrant strains, 15 fall into the category of "micro-aerogenic," and the remaining 68 produced gas slowly, if at all, at 37° C. (frequently requiring 96 hours for gas formation) but very luxuriantly, as a rule, at 30° C. (lower temperatures were not employed) and may be tentatively considered to fall into the class of "pseudo-micro-aerogenic" coliform bacilli. Practically all of these strains were isolated from the same source—Lake Michigan chlorinated, but not filtered, water supplies. It is rather interesting to note that only one of the strains was obtained from samples submitted during the winter, whereas the remaining 67 cultures were isolated from summer samples. It was

TABLE 3

*Distribution of Coliform Bacteria Isolated from Chlorinated Water with Respect to Season of Isolation, Aerogenic Properties and Allocation to Sections of Coliform Group*

Section		Aerobacter V.P.+ Cit.+		Escherichia V.P.— Cit.—		Intermediate V.P.— Cit.+		Total
Indol		+	—	+	—	+	—	
Gas from Lactose Broth	Modified Stuart Grouping	No. of Strains from Winter Samples						
>10% at 37° C. >10% at 30° C.	Normal	1	11	7	..	4	7	30
<10% at 37° C. <10% at 30° C.	Micro-aero- genic	..	3	..	..	1	..	4
<10% at 37° C. >10% at 30° C.	Pseudo-micro- aerogenic	..	1	..	..	..	..	1
Total		1	15	7	..	5	7	35
No. of Strains from Summer Samples								
>10% at 37° C. >10% at 30° C.	Normal	4	32	3	2	2	33	76
<10% at 37° C. <10% at 30° C.	Micro-aero- genic	..	4	1	3	..	3	11
<10% at 37° C. >10% at 30° C.	Pseudo-micro- aerogenic	..	29	2	9	5	22	67
Total		4	65	6	14	7	58	154

suggested that they probably represented soil forms, washed in with the spring rains, which were possibly allied to the plant pathogens at least with respect to their growth temperature relationships.

Of these 68 "pseudo-micro-aerogenic" strains, 30 were allocated to the *Aerobacter* section—all being Voges-Proskauer-positive, citrate-positive and indol-negative; 27 were considered to be in the "intermediate" section, being Voges-Proskauer-negative, citrate-positive (among these were included 5 strains which produced indol), and the remaining 11 strains were tentatively placed in the *Escherichia* section on the basis that they were V.P.-negative and citrate-negative (only two produced indol).

Stuart, *et al.* pointed out that they failed to encounter any strains of the genus *Escherichia* among the cultures they considered to be "pseudo-micro-

aerogenic." Of the 11 presumably "pseudo-micro aerogenic" strains in this study tentatively allocated to the *Escherichia* section, only 2 would have been so classified on the basis of being indol-positive and citrate-negative, and it should be further noted that our observations were restricted to the temperatures range of 30° C. to 43° C. and that the possibility of mixed cultures always exists.

The introduction of surface tension reducing compounds into media for elimination of lactose fermenting organisms, particularly spore formers, responsible for spurious presumptive tests, has been extensively studied by Mallmann. The following limited observations are presented to supplement his more extensive work.

Among 630 standard lactose broth tubes inoculated with 10 cc. portions of chlorinated water, 94 positive presumptive tests were obtained (see Table 4).

TABLE 4

*Comparison of Lactose Broth and Tryptose-Lauryl-Sulfate Lactose Broth for Detection of Coliform Bacteria in Chlorinated Water*

Enrichment Medium	Tubes Planted	Positive Presumptive Tests	Gas in B.G. Bile from Pos. Pres. Test	Completely Confirmed from Pos. Pres Test
		No. of Tubes after 48 Hours		
Lactose Broth	630	94	20	9
Tryptose Broth	630	11	10	10
No. of Tubes after 96 Hours				
Lactose Broth	630	205	32	18
Tryptose Broth	630	23	17	16

Data obtained in conjunction with studies on the bacteriology of chlorinated water supported by a grant from the Wallace & Tiernan Co., Inc.

Of these, 20 showed gas when transferred to brilliant green bile as recommended for the partially confirmed test in Standard Methods. Only 9 of the positive presumptive lactose broth tubes were confirmed by the completed test (eosine-methylene-blue agar to ricinoleate broth, etc.). From the 630 duplicate 10 cc. portions of water inoculated into tryptose-lauryl-sulfate lactose broth only 11 positive presumptive tests were obtained of which 10 produced gas when transferred to brilliant green bile and 10 positive confirmations were obtained by the E.M.B. agar and ricinoleate broth completed test technic. It is quite evident that the tryptose medium tremendously reduced the number of spurious presumptive tests.

Upon further incubation (96 hours) of the lactose broth presumptive test medium, 205 tubes were positive, of which 32 showed gas in brilliant green bile sub-plants and 18 positive confirmations were obtained employing the completed test as described above. With the tryptose-lauryl-sulfate medium the number of positive presumptive tests rose to 23, of which 17 showed gas in brilliant green bile transfers and 16 positive confirmations were obtained by the completed test.

It is apparent therefore that the brilliant green bile (2 per cent) partially confirmed test eliminated a large

proportion of spurious presumptive tests, though permitting a number of non-coliform organisms, presumably spore formers, to grow, and that for the limited number of samples studied, the tryptose-lauryl-sulfate presumptive test was a more dependable index of the probable presence of coliform bacteria than the brilliant green partially confirmed test. It appears from the few data which are presented that slow lactose fermenters were not eliminated by the tryptose medium.

The difference in the number of completely confirmed tests using lactose broth and the tryptose medium is not significant because of the small number of observations on completed tests confirmed, but it is interesting to note that in one instance what appeared to be a typical coliform organism on eosine-methylene-blue agar (the colonies had a distinct sheen but differed from typical *Escherichia* in that they were not discrete but coalesced) did not show gas in the tryptose-lauryl-sulfate medium when first isolated, and was a slow fermenter.

The characteristics of a peculiar organism isolated from chlorinated water may be of some interest at this time.\*

\* A detailed report is in preparation by J. M. Coblenz of the Iowa Engr. Exper. Sta., who detected the culture.

The organism in question conforms to the characterization of the coliform group of bacteria as stipulated in the *Standard Methods of Water Analysis*, namely, it is a Gram-negative non-spore-forming rod, ferments lactose with gas production, and grows aerobically, but it was found to be extremely more resistant to chlorination than are the typical coliform bacteria. In a phosphate buffered water, at pH 7 in which typical cultures of *Escherichia coli* were killed in 10 to 15 minutes upon the addition of 0.5 p.p.m. available chlorine, this organism survived for a period of 120 minutes. The organism appears to have many of the characteristics of the genus *Aerobacillus* but we have not been able to demonstrate the existence of spores, and the culture, though more resistant to heat than *Escherichia coli*, was not highly heat resistant, as it was killed in 10 minutes at 80° C. The organism does not grow very well on nutrient agar but very luxuriantly in the presence of carbohydrates and produces very small colonies with a metallic sheen on eosine-methylene-blue agar. It does not grow on the MacConkey agar medium or in the tryptose-lauryl-sulfate medium of Mallmann.

Characterization of lactose fermenting bacteria of sanitary significance, and adoption of methods for their detection so as to eliminate "pseudo-micro-aerogenic" coliforms, the spore-forming lactose fermenters, and such extremely resistant coli-like strains as those described above (which probably are not members of the true coliform group but more likely asporogenous aerobacilli) should materially facilitate water analysis. The introduction of precautionary measures for assuring a rapid rise of the presumptive test medium to 37° C. as suggested by Stuart and the use of tryptose-lauryl-sulfate lactose broth (Mallmann) for the presumptive test are therefore worthy of careful and

sympathetic consideration as procedures for expediting and simplifying the bacteriological examination of water.

#### SUMMARY

The importance is pointed out of temperature of incubation in the determination of characteristics of the coliform group of bacteria, and for the purpose of eliminating organisms of the group which are not of sanitary significance.

It is suggested that the methyl red test, because of the confusion introduced into the literature by failure to adhere strictly to the recommended temperature and incubation period stipulated for the determination, be dispensed with in favor of Voges-Proskauer reaction with which it is well correlated.

The technics recommended in *Standard Methods of Water Analysis*, 8th edition, are conducive to suppression of the number of positive Voges-Proskauer and negative methyl red tests, so that strains of *Aerobacter* tend to be allocated to the *Escherichia* or "intermediate" sections.

The  $\alpha$ -naphthol reagent for detection of acetylmethylcarbinol (Voges-Proskauer test) is much more delicate than the Standard Methods potassium hydroxide reagent, and the lower temperatures of incubation (30° C.) yielded a greater number of positive Voges-Proskauer tests.

The production of indol is an important differential reaction.

A limited number of observations employing standard lactose broth and the tryptose-lauryl-sulfate lactose broth in parallel confirmed the value of the latter medium as a presumptive test for the coliform group of bacteria and for the suppression of spore-forming aerogenic bacteria. This medium did not, however, eliminate the slow lactose fermenters.

The possibility of eliminating spurious presumptive tests due to "pseudo-



micro-aerogenic coliform bacteria" by quickly bringing the test medium to the desired temperature and the suppression of spore-forming lactose fermenters by the use of tryptose-lauryl-sulfate broth, appears very promising.

## REFERENCES

1. Barritt, M. W. *J. Path. & Bact.*, 42:441, 1936.
2. Reed, R. S., and Norton, J. F. *A.J.P.H.*, 27:560, 1937.
3. Clark, W. M., and Lubs, H. A. *J. Infect. Dis.*, 17:160, 1915.
4. Griffin, A. M., and Stuart, C. A. *J. Bact.*, 40:83, 1940.
5. Levine, M., Carpenter, P., and Coblenz, J. M. *J. Am. Water Works A.*, 31:1511, 1939; *J. Bact.*, 40:143, 1940.
6. Mallmann, W. L., and Darby, C. W. *J. Am. Water Works A.*, 31:689-701, 1939.
7. Parr, L. W. *Bact. Rev.*, 3:1, 1939.
8. American Public Health Assn. *Standard Methods of Water Analysis*. 8th Ed., 1936.
9. Stuart, C. A., Griffin, A. M., and Baker, M. E. *J. Bact.*, 36:391, 1938.
10. Stuart, C. A., Mickle, F. L., and Borman, E. K. *A.J.P.H.*, 30:499, 1940.
11. Vaughn, R., Mitchell, N. B., and Levine, M. *J. Am. Water Works A.*, 31:993, 1939.

## Infant Mortality Rate Drops to 48

THE Census Bureau on March 7 announced a reduction of the infant mortality rate for 1939 to 48 deaths per thousand live births, compared with 51 the year before and 68 ten years ago. The deaths of infants under 1 year, exclusive of stillbirths, were 108,846 in 1939, as compared with 116,702 in 1938.

Pointing out that the present death total for infants was equal to the population of such cities as Canton, Ohio, and Tampa, Fla., the Census Bureau expressed the belief that the rate was susceptible to further drastic decreases as indicated by the achievements of certain states. If, for instance, there had prevailed over the entire United States

the low rate of Oregon, there would have been almost 28,000 fewer infant deaths in 1939. If, on the other hand, the high rate of New Mexico had prevailed nationally it would have meant an increase of more than 138,000 infant deaths.

Fourteen states achieved an infant mortality rate less than 40, as follows: Oregon, Minnesota, Connecticut, Nebraska, Washington, Massachusetts, Illinois, New Jersey, Iowa, New York, Rhode Island, Kansas, Indiana and Utah.

The rate for white infants was 44.3 and Negro 73.2. The rate of 48 was less than half the rate of 101 recorded in 1918.

# Comparison of Methods for Sampling Lead Fume\*

LEWIS B. CASE

*General Chemistry Department, Research Laboratories Division, General Motors Corporation, Detroit, Mich.*

TWO forms of apparatus are in common use for collecting samples in tests involving lead fume. Impingers, both singly and in series, have been used extensively. The general use of electrostatic samplers for the purpose is relatively new, and a question arises as to what, if any, mathematical relation may exist between the two.

The matter has been the subject of previous tests. Littlefield, Feicht, and Schrenk<sup>1</sup> report 9 tests in which efficiencies (based on electrostatic results) of single large impingers ranged from 21 to 53 per cent, and the combined efficiencies of two impingers in series varied from 55 to 60 per cent. The concentrations involved in the tests, as shown by the electrostatic sampler, varied from approximately 5 to approximately 33 mg. per cu. m., or 50 to 330 per 10 cu. m.

Halley and Martin<sup>2</sup> report results using 4 impingers in series and indicating efficiencies varying from approximately 45 to approximately 85 per cent.

The portion of the present series of tests, which relates to concentrations of fume in the range covered by the various concepts of a permissible limit, indicates ratios that are low and variable. They are variable in a rather unpredictable manner and to a rather undesirable ex-

tent. Higher efficiencies are indicated in connection with the comparatively high concentrations.

It seems reasonable to assume that a ratio between an impinger test and an electrostatic test is principally a function of particle size. It is, therefore, appropriate to state that the results reported herein may apply only to the conditions involved in the tests and that fume formed at other temperatures, or in the presence of oxygen, or at other rates of ventilation, might produce other ratios.

One and five-tenths milligrams per 10 cu. m. is commonly, but not by any means universally, recognized as a reasonable limit for lead in the air of factories. Other limits of the same general order of magnitude have been suggested. The 1.5 mg. concept is based principally on investigations made by U. S. Public Health Service in plants manufacturing storage batteries.<sup>3, 4, 5</sup> The samples were collected in the Public Health Service investigation by means of impingers. It is important to remember, however, that the majority of the men examined were exposed to dust rather than to fume and that the impinger apparently is quite efficient in the collection of lead dust.<sup>1</sup>

A suggestion has been offered on various occasions to the effect that the respiratory organs are not efficient in the retention of lead fume, and, therefore, the impinger may be a better

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

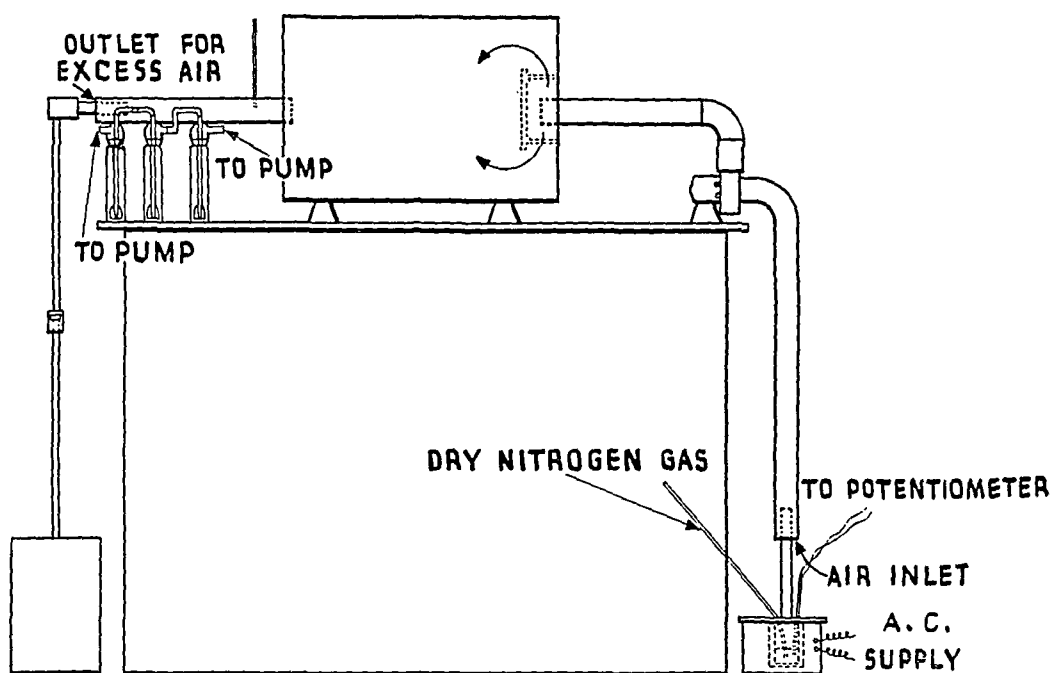


FIGURE 1.

measure of the actual exposure because it also is not very efficient. It seems prudent to assume a somewhat skeptical attitude toward this idea until it has received experimental support.

A diagram of the apparatus used in making the present series of tests is shown in Figure 1. Lead was heated in an atmosphere of nitrogen in the furnace shown in the lower right corner. The nitrogen, containing the fume, was then diluted with air. The mixture was passed through a blower, against a baffle in a settling chamber, and then into the outlet pipe. The samples were taken simultaneously from the outlet pipe, as shown. The speed of the blower was regulated to produce an excess of contaminated air. Commercial dry nitrogen was used without further purification. No substantial amount of dross was formed. In obtaining the lower concentrations, the nitrogen was conducted into the furnace. In obtaining the higher concentrations, the nitrogen was bubbled through the molten lead as a means of increasing the effective

surface. The temperature of the lead varied from approximately 700 to 800° C.

Ten per cent by volume of reagent strength nitric acid was used in the impingers, which were the all-glass variety. The sampling rate was 1 cu. ft. per minute.

The amount of lead entrapped by the sampling apparatus was estimated by a method employing diphenylthiocarbazone and a photoelectric instrument.

Results of tests comparing impingers with the electrostatic sampler are shown in Table 1.

Table 2 shows comparative results obtained in a plant in which extensive soldering operations are performed. The distances between the sampling apparatus and the molten solder were about 18 in. in some of the tests, and perhaps 4 ft. in others. The time of sampling was approximately 30 minutes. It seems reasonable to assume that the concentrations of fume may have differed substantially within distances of a few inches. This in turn suggests that

TABLE 1

Test Number	Elec. Sampler	Impinger No. 1	Impinger No. 2	No. 1+No. 2	Ratio: No. 1+	Single Impinger	Ratio: Impinger
					No. 2 Elec.		Elec.
28	1.4	0.11	0.14	0.25	0.18	0.15	0.11
29	1.0	0.10	0.11	0.21	0.21	0.12	0.12
30	1.0	0.09	0.11	0.20	0.20	0.10	0.10
31	0.9	0.06	0.06	0.12	0.13	0.11	0.12
32	0.7	0.07	0.08	0.15	0.21	0.07	0.10
33	0.5	0.06	0.07	0.13	0.26	0.06	0.12
34	0.5	0.03	0.07	0.10	0.20	0.06	0.12
35	0.5	0.05	0.09	0.14	0.28	0.06	0.12
36	25.9	9.7	4.0	13.7	0.53	9.5	0.37
37	42.7	27.2	1.8	29.0	0.68	27.0	0.63
38	24.4	13.6	2.9	16.5	0.68	13.6	0.56
39	23.2	13.2	2.6	15.8	0.68	13.2	0.57
44	5.2	1.5	1.2	2.7	0.52	1.5	0.29
45	6.8	2.3	1.5	3.8	0.56	2.1	0.31
46	13.2	5.7	1.4	7.1	0.54	5.6	0.43
47	15.8	6.2	1.8	8.0	0.51	5.9	0.37

Milligrams of lead per 10 cubic meters of air

ample sampling time should be allowed in such circumstances.

TABLE 2

Test Number	Electro-static Sampler	Single Impinger Water	Two Impingers in Series 10% Nitric Acid
5	3.1	1.2	2.5
6	2.3	1.3	2.3
7	1.3	1.2	0.9
8	0.7	0.8	0.5
10	2.2	2.9	2.3
11	1.4	2.2	1.4
12	0.3	0.8	...
13	0.2	0.8	...
14	2.6	2.9	...
15	2.1	0.6	...
21	2.0	0.6	...
24	0.3	0.6	...

Milligrams of lead per 10 cubic meters of air

A few experiments have been made with the asbestos filters known in laboratory parlance as Gooch crucibles. The asbestos pads were approximately  $\frac{3}{8}$  in. thick, and the rate of air flow was approximately 0.2 cu. ft. per minute. The lead was dissolved from the asbestos and determined by the dithizone procedure. The results are shown in Table 3.

The figures indicate that the filters compare quite favorably with the impingers. They have the disadvantage of a low sampling rate, which may not be too serious when samples representing long periods of time are desired. The use of filters is not, of course, recommended on the basis of these few tests, but apparently may merit further consideration in situations where electrostatic apparatus is not available.

There may be some uncertainty as to whether the electrostatic sampler retains all of the fume. Barnes<sup>6</sup> experimented with two electrostatic samplers in series. The first instrument, when operating at the recommended voltage, retained ap-

TABLE 3

Test Number	Electrostatic Sampler	Asbestos Filter	Ratio
48	14.6	9.6	0.66
49	12.5	10.3	0.83
50	8.3	5.9	0.71
51	3.0	2.7	0.90
52	3.1	2.6	0.85
53	3.8	3.4	0.90
54	0.51	0.36	0.70
55	0.38	0.28	0.74

Milligrams of lead per 10 cubic meters of air

proximately 99.5 per cent of the total lead collected. That phase of the problem, however, is beyond the scope of this paper.

In summary, we may state that the tests conducted under controlled conditions indicate that the efficiencies of impingers, as compared to the electrostatic sampler, are higher when dealing with relatively great concentrations than with relatively small. The experiments did not, however, disclose any ratio which is sufficiently definite to be very useful. The comparative tests made in the plant no doubt were further complicated by the lack of uniformity commonly encountered when testing close to the sources of contamination. Particle size also may have been a factor. The comparisons made with the asbestos filters indicate less inconsistency than was found with the impingers.

It appears that most, perhaps all,

tests for small amounts of contaminants in air are beset with various complications and uncertainties. Quantitative estimations of lead fume appear similar to the others in that respect and need to be interpreted accordingly.

#### REFERENCES

1. Littlefield, J. B., Feicht, Florence L., and Schrenk, H. H. Efficiency of Impingers for Collecting Lead Dusts and Fumes. Bureau of Mines *Rep. Invest.*, 3401, 1938.
2. Halley, James W., and Martin, Edwin Dudley. Lead Bearing Steels, Control of Possible Health Hazards During Fabrication. *Metal Progress*, 37, 4:412 (Apr.), 1940.
3. Russell, Albert E., Jones, Roy R., Bloomfield, J. J., Britten, Rollo H., and Thompson, Lewis R. Lead Poisoning in a Storage Battery Plant. *Pub. Health Bull.* 205, 1933.
4. Bloomfield, J. J. Discussion of Engineering Problems in a Lead Hazard. National Battery Manufacturers Association, *Convention Minutes*, Part II, October 25-26, 1939.
5. Dreesen, W. C. Report of Survey of Lead Hazard in the Storage Battery Industry. National Battery Manufacturers Association, *Convention Minutes*, Part II, October 25-26, 1939.
6. Barnes, Edgar C. Electrostatic Dust Sampler as Used in Sampling Lead Fume. *Safe Practice Bull.* 57. Dept. of Labor & Industry, Commonwealth of Pennsylvania. Nov., 1939.

# Comparative Efficiency of Plating Media for the Isolation of *Shigella Dysenteriae*\*

CATHERINE R. MAYFIELD AND MAUD GOBER

*Division of Laboratories, Mississippi State Board of Health, Jackson, Miss.*

IN a five year comparative study of the incidence of bacillary dysentery in the United States and possessions for the years 1933-1937, Joseph Felson<sup>1</sup> found a total of 79,042 cases. Since bacillary dysentery is not reportable in all of the states, this number of cases includes only the cases from the 21 states and possessions in which bacillary dysentery is reportable. Of these 79,042 cases reported, 45,172 were reported from the State of Mississippi. During the years 1937 through 1939, 28,755 cases were reported to the Bureau of Communicable Disease of Mississippi. The Division of Laboratories of Mississippi isolated 128 *Shigella dysenteriae* in 1937, 200 in 1938, and 246 in 1939. This increase in positive isolations may be due to a more demonstrable interest on the part of physicians in the state as well as improvement in laboratory methods for the isolation of *Shigella dysenteriae*.

During recent years much attention has been directed toward the development of a more efficient medium for the isolation of *Shigella dysenteriae*. Paulson<sup>2</sup> reported that desoxycholate and desoxycholate-citrate agars devised

by Leifson<sup>3</sup> were superior to Endo and eosin-methylene-blue agars as plating media. Hardy<sup>4</sup> and Watt have confirmed these observations, particularly as they applied to the isolation of the Flexner varieties. Irons<sup>5</sup> and his associates found that desoxycholate-citrate was superior to MacConkey's agar for the isolation of organisms of the Flexner group, but concluded that it should be used in conjunction with a less restrictive medium in the quest for the other *Shigella dysenteriae*. Coleman<sup>6</sup> states that complete reliance cannot be placed on desoxycholate-citrate agar for the isolation of all types of *Shigella dysenteriae* and recommends the addition of at least one plating medium less restrictive.

The purpose of this paper is to report the comparative efficiency of plain Endo, lithium chloride Endo, desoxycholate-citrate, bismuth sulfite and *Shigella Salmonella* culture media for the isolation of *Shigella dysenteriae* from routine feces specimens received at the Laboratories of the Mississippi State Board of Health.

The laboratory findings from any specimen depend largely upon the collection of the specimen and its subsequent delivery to the laboratory. Feces specimens are collected in a screw-top, 1 oz. glass jar containing a 30 per cent

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

glycerol solution (in 0.85 per cent salt solution), which has been autoclaved at 121° C. for 15 minutes. Instructions for inoculating the glycerine with a small amount of feces (not to exceed 1 gm., about the size of a bean) are given with each specimen container. Specimens must be forwarded to the laboratory in order to have them arrive not later than 48 hours after the time of collection. Specimens having an excessive amount of feces and those over 48 hours old from the time of collection until they reach the laboratory are reported as unsatisfactory and another specimen is requested.

Specimens are inoculated on the plating media used for isolation the day they are received, then placed in a 20° C. refrigerator and repeated platings made again on the second and third days. The plates are examined after 18 hours' incubation and suspicious colonies are fished to triple sugar tubes. Cultures giving characteristic reaction of *Shigella dysenteriae* on this medium are inoculated into tubes of semi-solid agar<sup>7</sup> containing the following carbohydrates: xylose, lactose, dulcitol, manitol, rhamnose, saccharose, and sorbitol. Tubes of Simons citrate<sup>8</sup> agar and Jordon and Harmons<sup>9</sup> sodium potassium tartrate agar are also inoculated from the triple sugar tubes. At the time of inoculating the carbohydrates, tartrate and citrate, a very small

amount of the growth on the triple sugar slant is emulsified in Difco tryptone broth and restreaked on a plain Endo plate. A tube of Difco motility test medium<sup>10</sup> is also stabbed for the motility test. If the restreak on plain Endo shows that the culture is not pure, colonies are fished from this plate to triple sugar and again tested in the same manner. The tryptone broth culture after 24 hours' incubation is tested for indol production. The macroscopic slide agglutination is done with the anti-*Shigella dysenteriae* serum indicated by the cultural reactions. If a strain is isolated which gives the typical cultural reaction of a *Shigella dysenteriae* but which does not agglutinate with antiserum used, this culture is subcultured daily on a plain agar slant. Usually 6 to 8 transfers are sufficient to render the culture agglutinable. All non-motile cultures isolated which do not agglutinate with a known *Shigella dysenteriae* antiserum are stored for further study and a transfer of the culture sent to other laboratories for aid in identification.

All feces specimens are routinely plated on lithium chloride, desoxycholate-citrate and bismuth sulfite. Plain Endo is not used unless the examination for bacillary dysentery is requested or the specimen appears to contain mucus or blood. Previous findings<sup>7</sup> have shown that the additional

TABLE 1  
Positive *Shigella dysenteriae* for Years 1937 through July, 1940  
773 Positives

Type	1937	1938	1939	Jan.-July, 1940	Total
Flexner Group	108	138	186	140	572
Shig.	8	42	42	23	115
Shig.	4	1	5	7	17
Shig.	4	5	3	1	13
Shig.	4	11	4	16	35
Shig.	..	1	3	4	8
Shig.	..	2	3	8	13
Total	197	209	246	199	773

positive isolations obtained by the use of plain Endo do not warrant its inclusion. Table 1 is a tabulation of all positive *Shigella dysenteriae* isolated during the years 1937 through July of 1940.

It will be noted from Table 1 that Flexner is the predominating type isolated, with Sonne second, and Newcastle third. The *Shigella dysenteriae* classified in the "Flexner Group" are those called the positive manitol group by some classifications, namely Flexner, Hiss-Russell Y, Y-Hiss, Strong, and Mt. Desert. A polyvalent antiserum including several strains of Flexner and the above mentioned cultures is used for agglutination of this group. Monovalent sera are used for the identifica-

tion of other *Shigella dysenteriae*. All antisera are made in this laboratory by the method recommended by Havens.<sup>11</sup> A number of the Sonne type isolated in 1937 were non-agglutinable when first isolated. An antiserum was prepared in 1938 from a transfer of Koser's Sonne obtained from the University of Chicago which has been a very satisfactory serum. Agglutination is generally obtained from the triple sugar tube, but occasionally a Sonne will have to be transferred a couple of times before agglutination is obtained. The Newcastle isolated in 1937 and 1938 were thought to be non-agglutinable varieties of Flexner not included in the anti-polyvalent serum being used. All of these strains agglutinated with the anti-

TABLE 2

Comparison of Desoxycholate-citrate, Plain Endo, Lithium Chloride Endo, and Bismuth Sulfite Agars for Isolation of *Shigella dysenteriae* from Feces

435 Positive Specimens

Media Used for Isolation

Type Dysenteriae	Hours →	Desoxycholate- citrate Repeated Plating			Plain Endo Repeated Plating			Lithium Chloride Endo Repeated Plating			Bismuth Sulfite Repeated Plating			Total Positives
		24	48	72	24	48	72	24	48	72	24	48	72	
Flexner Group		219 (68)	67 (41)	18 (15)	100 (2)	44 (3)	8 (1)	35 (1)	22 (1)	10 (1)	6 (2)	..	..	314
Sonne		48 (15)	12 (6)	5 (3)	25 (2)	11 (2)	5 (2)	9	3	1	..	..	..	69
Shiga		10 (9)	3 (2)	1	3 (2)	2 (1)	..	..	..	..	..	..	..	17
Schmitz		2 (2)	1 (1)	..	1	..	..	2 (1)	..	..	1	..	..	4
Newcastle		12 (6)	4 (3)	3 (1)	3	2	2 (1)	2	1 (1)	..	2	..	..	21
Dispar		4 (1)	3	..	2	..	..	..	1	..	..	..	..	7
Unclassified (Pos. Sorbitol)		2 (2)	..	1 (1)	..	..	..	..	..	..	..	..	..	3
Total by Media		415 (175)			208 (14)			86 (4)			10 (2)			

Total Positives

435

Numbers in parentheses are specimens positive on this particular medium on this day only.



serum produced against Oxford strain of Newcastle and culture 6089-35 isolated in this laboratory in 1935. About 50 per cent of the Newcastle ferment dulcitol and not manitol. No culture with acid and gas in dulcitol has been isolated. It may be of interest to some that all of the Shiga have been isolated from feces specimens received through the mail. The type marked "positive sorbitol," type unclassified, seems to be a group of *Shigella dysenteriae* not included in any of the dysenteriae classified in Table 1. Sorbitol is the only carbohydrate fermented (from 3 to 8 days) of the ones used routinely. All strains isolated with these cultural reactions are agglutinated by an antiserum made from one of the cultures isolated from a patient having clinical symptoms of dysentery. There is no cross-agglutination between these cultures and the antisera of the Shiga and Newcastle.

The comparative study of plain Endo, lithium chloride Endo, desoxycholate-citrate, and bismuth sulfite agars includes 435 positive isolations of *Shigella dysenteriae*. These results are tabulated in Table 2.

The number of positive isolations from desoxycholate-citrate was 415 in comparison with 208 from plain Endo (using two plates), 86 from lithium chloride Endo, and 10 from bismuth sulfite. Very few isolations were made from the other media which were not made from desoxycholate-citrate medium. Of the 435 positives only 20 failed to be isolated from desoxycholate-citrate. If desoxycholate-citrate agar had not been used 175 of the 435 positives would have been reported negative. Eleven of the Shiga strains were positive on this medium only, while only 3 were positive on plain Endo which were negative on desoxycholate-citrate.

Attention is called to the number of positive isolations obtained on the sec-

ond and third day's plating which were negative on the first day. This laboratory has been able to isolate from 20 to 30 per cent more positives both of *Shigella dysenteriae* and *Eberthella typhosa* by these additional platings. Plates picked one day have been held another 24 hours and examined again, but this method has not yielded any additional positives. Occasionally a first day's plate held and repicked after 24 hours proved to be positive; however, in each instance the second day's plating was positive.

Recently the Difco Laboratories have developed a new medium, Shigella Salmonella agar, which has proved very successful for the isolation of *Shigella dysenteriae* and other enteric organisms. This medium has been compared with desoxycholate-citrate agar and found to be an excellent medium. Since Shigella Salmonella agar has been used only a few months in this laboratory, the results obtained in the isolation of all enteric organisms have been recorded. The results of this comparison with 1,062 specimens are given in Table 3.

There were 379 positive isolations made from Shigella Salmonella agar and 356 from desoxycholate-citrate agar, in a series of 1,062 fecal specimens. Of the 379 positives from Shigella Salmonella agar, 48 were isolated from this medium only. Of the 356 positives from desoxycholate-citrate agar, 25 were isolated from this medium only. While only two Shiga strains were isolated during this comparison, they were positive on both media. From the results obtained in Table 3 Shigella Salmonella agar appears to be equally as efficient as desoxycholate-citrate agar. The differentiation between the fecal and pathogenic colonies is more defined on the Shigella Salmonella agar. The economy as well as the efficiency of Shigella Salmonella is an important item to be considered.

TABLE 3

*Comparison of Desoxycholate-citrate and Shigella Salmonella Agars for Isolation of Enteric Organisms*

1,062 Specimens

Hours	→	Positive Cultures	Shigella Salmonella Repeated Plating			Desoxycholate-citrate Repeated Plating		
			24	48	72	24	48	72
Typhoid		101	84 (4)	12 (2)	4 (1)	86	8 (1)	..
Flexner Group		126	101 (6)	17 (5)	4 (1)	94 (1)	14 (1)	6 (2)
Shiga		2	2	..	..	2	..	..
Sonne		20	14 (2)	3 (1)	1 (1)	12 (1)	4 (1)	..
Newcastle		16	10 (3)	2 (1)	2	7	1	4 (2)
Dispar		3	2	..	..	3 (1)	..	..
Unclassified Positive Sorbitol		4	3	1 (1)	..	2	1	..
S. Alkaescens		4	4	..	..	4	..	..
S. Paratyphoid B.		2	2 (1)	..	..	1	..	..
Morgan's Bacillus		126	76 (10)	26 (4)	9 (5)	80 (11)	19 (1)	8 (3)
Total Positive by Media					379 (48)			356 (25)
Total Positive		404						
Total Negative		658						
Total Specimens		1,062						

Numbers in parentheses are specimens positive on this particular medium on this day only.

#### SUMMARY AND CONCLUSION

The incidence of bacillary dysentery in Mississippi is very high if the number of cases reported to the Bureau of Communicable Diseases may be used as an index. During the years of 1937 through 1939, 28,755 cases were reported. The Division of Laboratories reported 128 positive isolations in 1937, 200 in 1938, and 246 in 1939. Improved laboratory methods as well as more manifest interest among the physicians and health officers of the state may account for the increase in the positive isolations as indicated in Table 1.

In a comparison of desoxycholate-citrate, plain Endo, lithium chloride

Endo, and bismuth sulfite agars, 435 positive cultures of *Shigella dysenteriae* were isolated on one or more of the four media with 415 (95 per cent) positive on desoxycholate-citrate, 208 (48 per cent) positive on plain Endo, 86 (20 per cent) positive on lithium chloride Endo, and 10 positive on bismuth sulfite. The marked efficiency of desoxycholate-citrate for the isolation of *Shigella dysenteriae* of all types is shown in Table 2. Of 435 positive isolations, 175 were positive only on desoxycholate-citrate, compared with 14 from plain Endo, 4 from lithium chloride Endo, and 2 from bismuth sulfite agars.

A series of 1,062 fecal specimens has been compared on desoxycholate-citrate and Shigella Salmonella agars, the latter medium having been recently prepared by the Difco Laboratories. There were 404 positives enteric isolations made in this series, 379 from Shigella Salmonella and 356 from desoxycholate-citrate agar. The efficiency of Shigella Salmonella agar as compared with that of desoxycholate-citrate for the isolation of *Shigella dysenteriae* as well as other enteric organisms is shown in Table 3.

The additional positive isolations obtained by repeated plating of the fecal specimens the second and third days are shown in Tables 2 and 3. The positive isolations listed under 48 and 72 hours are positives which were negative on the 24 hour plates and would have been reported negative had only the one day's plating been made.

## REFERENCES

1. Felson, J. Problem of Bacillary Dysentery; Five Year Survey. *Am. J. Trop. Med.*, 19:333-343 (July), 1939.
2. Paulson, M. The Clinical Use of Desoxycholate and Desoxycholate-citrate agars for the Isolation of Intestinal Pathogens. *Am. J. M. Sc.*, 193:688, 1937.
3. Leifson, E. New Culture Media Based on Sodium Desoxycholate for the Isolation of Intestinal Pathogens and the Enumeration of Colon Bacilli in Milk and Water. *J. Path. & Bact.*, 40:581, 1935.
4. Hardy, A. V., and Watt, J. The Acute Diarrheal Disorders. *A.J.P.H.*, 28:730, 1938.
5. Irons, J. V., Bohles, S. W., De Shazo, T., and Hewlett, L. L. Observations on MacConkey's and Desoxycholate-citrate Agars for the Isolation of Dysentery Bacilli. *J. Lab. & Clin. Med.*, 25:81-85 (Oct.), 1939.
6. Coleman, M. B. The Differentiation and Identification of Bacillary Incitants of Dysentery. *A.J.P.H.*, 30:39-42 (Jan.), 1940.
7. Mayfield, C. R., and Gober, M. Isolation of *Eberthella typhosa*, *A.J.P.H.*, 30:69-76 (Jan.), 1940.
8. Simmons, J. S. A Culture Medium for Differentiating Organisms of Typhoid, Colon Aerogenes Groups and for Isolation of Certain Fungi. *J. Infect. Dis.*, 39:209-214, 1926.
9. Jordon, E. O., and Harmon, P. H. A New Differential Medium for the Paratyphoid Group. *J. Infect. Dis.*, 42:238-241, 1928.
10. Motility Test Median. *Difco Manual*, 6th ed., 1939, p. 139.
11. Havens, L. C. *The Bacteriology of Typhoid, Salmonella and Dysentery Infections and Carrier States*, Commonwealth Fund, 1935.

# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

April, 1941

Number 4

---

H. S. MUSTARD, M.D., *Editor*

MAZŮCK P. RAVENEL, M.D., *Editor Emeritus*

LEONA BAUNGARTNER, M.D., *Associate Editor*

ARTHUR P. MILLER, C.E., *Associate Editor*

AUGUSTA JAY, *Editorial Associate*

## *Editorial Board*

REGINALD M. ATWATER, M.D.

*Chairman, and Managing Editor*

IRA V. HISCOCK, Sc.D.

KENNETH F. MAXCY, M.D.

HENRY E. MELENEY, M.D.

---

## IS THERE A DOCTOR IN THE BILL?

IN THE House of Representatives, on January 3, 1941, there was introduced by the late Mr. Pius L. Schwert, member of Congress from New York, a bill, H. R. 1074, which officially is designated as the "National Preparedness Act of 1941 for the improvement of physical and social fitness." The bill was referred to the Committee on Education.

The purpose of H. R. 1074 as set forth in the caption is "To promote the national preparedness and the national welfare through appropriation of funds to assist the several states and territories in making adequate provisions through schools for physical education, including athletics; instruction and guidance in healthful living; wider recreational use of school facilities; and the development of school camps." The bill calls for an appropriation of One Hundred Million Dollars (\$100,000,000) in 1941, with Two Hundred Million Dollars (\$200,000,000) for the fiscal year ending June 30, 1946, and for each year thereafter. One-half of the total amount would be utilized for school camps, the remainder for the other purposes set forth in the bill.

If the bill becomes a law, the U. S. Commissioner of Education, and the educational authorities of the several states, would administer it. Nationally, and in each state, there will be an advisory council, composed of members from "appropriate professions and agencies and other persons with special training in physical education, including athletics . . ."; and there would be "coöperation and, when necessary, to promote the objectives of this Act in accordance with the local pattern, working and financial agreements between state education agency or agencies and any other public agency or agencies administering these services related to the service furnished under the state plan, including public agencies concerned with welfare, health, conservation, recreation, camping and parks."

One's attitude toward such proposed legislation will, to some extent, be determined by his or her background, convictions and allegiances. The bill will undoubtedly be endorsed by many of those whose special interest is in the field of physical education; it is not likely to appeal to the majority of those engaged in the conventional activities of public health and medicine. Perhaps the former are overenthusiastic, the latter ultraconservative.

No one could argue against the desirability of robust youth instructed in and practising sound rules of hygiene. Further, the sharing of experiences, as in camps, the adjustments that are necessary in such circumstances, the development of ideals and a pride of membership in a group, be it camp or nation, which one respects—all these things raise morale and should give a new and fine vision of citizenship in the present, and maybe future, troubled times. And so, not only do we concede the importance of high morale in youth as a part of good mental hygiene, we emphasize its necessity as an element in national defense. Whether or not the school camps advocated in H. R. 1074 will reach this desirable goal must, of course, remain an open question: the answer will depend upon many and complex factors whose range of interplay is far wider than the limits of this editorial page.

We must, however, confess some doubts as to the wisdom of the parts of this bill which relate to the public health. We question seriously an approach which, except for health instruction, limits its service to the "prevention and correction of physical deficiencies" by programs of physical education. To spend this large amount of money in so narrow a field, and mainly for one age group, is far, far out of proportion to federal appropriations in state aid for all health purposes in the total population. We regret, too, any move to add confusion to a federal health administration which is already somewhat confounded; and we find it hard to believe that those who framed this legislation could, other than by intent, have so completely avoided any reference to utilization of two federal agencies already operating competently in the health field: The Children's Bureau, and the Public Health Service. Further, we find only an oblique reference to state health departments; and no, there is not a doctor in the bill.

All the above comments are editorial in nature. They may or may not be important. What is of definite significance, however, is the attitude of the Executive Board of the American Public Health Association in regard to the original Schwert Bill, which died with the last Congress. In part, the Executive Board, on December 20, 1940, expressed itself as follows: "If the time has come when a superstructure of health education can be supported through federal subsidy, we believe that it should be built on a sound medical program and corrective service as a first step. The administration of such services must not be divorced from the school medical program and the public health departments where experienced medical leadership is most readily available."

## MINIMUM FUNCTIONS AND ORGANIZATION PRINCIPLES FOR HEALTH ACTIVITIES

IN 1933 the Committee on Administrative Practice of the American Public Health Association, at the request of the Executive Board, prepared a statement on the essentials of health organization; and now a new draft brought up to date will be found in the Association's *Year Book* for 1940.

On study of these two documents, one is impressed with the soundness of public health programs and their administration. As would be expected, the new draft expands that part of the statement which deals with minimum functions, using as a basis for broadening the scope of public health work the following definition: "A health problem becomes one of public concern when, because of its nature

and extent, its solution requires organized group action." The new document, too, sets forth more clearly than did the old the functions of local health departments, and emphasizes important administrative relationships between national, state, and local health services.

Revisions of the sort mentioned above indicate that the Association, in a realistic manner, is keeping step with current problems and opportunities for service. What is even more gratifying than this, however, is that with a fine consistency the same general principles thread through both documents. True principles do not become obsolete with the passage of time, and because the basic concepts of 1933 remained unimpaired after scrutiny in 1940, one is encouraged to believe that in public health we are indeed operating upon sound principles. Actually one can trace this heritage of consistency in the American Public Health Association much further back than 1933. For example, in the 1940 draft of organization principles we find the following: "The scope and policies of public health work at any given time will depend upon the stage of development of medical, sanitary, and related sciences, and upon the readiness of the public to support their effective use." Put this now against an 1873 statement of Elisha Harris, first Secretary of the American Public Health Association: "The permanent value and success of any methods or system of sanitary government will depend upon the degree in which the people are generally enlightened, concerned, and made responsible, in regard to sanitary duties." Though the two statements differ in rhythm and character of expression, the sense of the one is remarkably similar to that of the other.

In calling to the attention of readers of the *Journal* the document on Desirable Minimum Functions and Organization Principles for Health Activities, we do so because we are convinced that it is a valuable contribution and a sheet anchor in public health practice. We make this reference, too, with a more subtle and ulterior purpose, for we hope that those who read the document in the *Year Book* will be tempted to read other things in that publication. The *Year Book* does not receive nearly as much consideration and study as its importance justifies.

## COCCIDIOIDOMYCOSIS

THE names of Rixford, Ophüls, Dickson, Gifford and Smith and their associates are inseparably associated with the development of our knowledge of what first was described in North America as "coccidioidal granuloma." The California workers have, to a great extent, had a monopoly on the study of this disease, largely due to the location in that state of the chief focus of infection in North America, the San Joaquin Valley. In recent years a few cases have been reported in Arizona, New Mexico, and Texas; hence in endeavoring to trace the origin of a case of infection with *Coccidioides immitis* it no longer suffices to inquire whether the patient ever has lived in the San Joaquin Valley. To the talent and the persistence of the workers mentioned above we are indebted for what seems to be relatively complete knowledge of several features of the infection.

What at first was considered a highly fatal, comparatively rare disease, of exceedingly limited geographical distribution, has, thanks to the work of recent years, been recognized as often a relatively trivial condition, far different clinically from the original type and of more widespread geographic distribution.

In the light of recent work, the fungus appears to cause a relatively benign respiratory infection, a bronchitis, or even a mild pneumonia, especially common among newcomers in the endemic area. One of the most remarkable manifestations of this type of the disease is the fact that many patients develop erythema nodosum. Indeed this characteristic combination of bronchial or pulmonary symptom complex and the subsequent cutaneous condition, always ending in recovery, was long known as "valley fever."

A very striking manifestation of the fungus infection, especially in the form known as coccidioidal granuloma, is the similarity, in the course, and gross and microscopic pathology to tuberculosis. Indeed, some pathological material filed away under the diagnosis of tuberculosis, upon restudy has been shown to present lesions due to *Coccidioides immitis*. Of great assistance in clinical studies is the skin test with coccidioidin, which appears to offer a high degree of sensitivity and specificity. The result of this test together with sputum examination, x-ray findings, and the clinical manifestations appear to make the diagnosis relatively easy, provided the condition is suspected. Not the least interesting feature of the disease is the fact that there have been a number of accidental infections among research workers due to the handling of cultures. Thus as a laboratory hazard the condition appears to align itself with tularemia and undulant fever, though with less serious results than with these. The California investigators believe that these and, indeed, infections under natural conditions, are due to inhalation of the dried spores.

Another feature of coccidioidomycosis is the existence of the disease in domestic animals, where the geographic distribution appears to be very similar to that of the infection in man.

A couple of years before the original California workers made their study, the description of the clinical condition had been made by investigators in South America. This later work nevertheless stands as an example of careful study and noteworthy achievement.

From the point of view of preventive medicine, but little is to be said. Prophylaxis against infectious diseases in general, with a few notable exceptions, becomes practicable only when we know the mode of spread of the organism, and when that may be controlled. If the present view that the causative organism of coccidioidomycosis is spread by the inhalation of dust is well founded, prevention in endemic areas practically is impossible. The one important fact in this field is that neither type of the disease spreads from person to person, or indeed so far as we know from the lower animals to man.

#### REFERENCE

- Smith, Charles Edward. Epidemiology of Acute Coccidioidomycosis with Erythema Nodosum ("San Joaquin" or "Valley Fever") *AJPH*, 30:600 (June), 1940

---

*Have you seen the Nomination Blank on page XXXIX?*

## Credit Lines

A Selective Digest of Diversified Health Interests

D. B. ARMSTRONG, M.D., AND JOHN LENTZ, M.S.

### THIS THING CALLED JARGON

CALLING all Health Educators! If you failed to read the editorial entitled "The Jargon May Get Us If We Don't Watch Out" (in the February, 1941, issue of the *Journal*, page 183), turn to it at your earliest opportunity and study it carefully. Those who read it once might profit by a second reading, for the editorial sounds a warning note that health educators should heed.

As health education has gradually developed into a professional specialty, it has acquired a jargon of its own—a specialized vocabulary for use not only between professional workers, but one which tends to invade the material designed for public consumption. We were not aware, however, of the extent and growth of this jargon until we listened to a panel discussion recently in which a number of health educators expressed their views on a school health problem. The jargon flew thick and fast, and, like the writer of the *Journal's* editorial, we too felt that we must be behind the times, that we had failed to keep up with the newer developments.

A plea to health educators to watch this development would seem to be in order. Most of our work—spoken or written—is designed for people who use simple vocabularies. There are few ideas in health education that cannot be

expressed in simple and clear English—or, as one observer has put it, "in small change language of the widest possible circulation."

Many authorities in various fields have frowned on the tendency of professional people to coin language that is meaningless to the uninitiated lay ear. Dr. William Nielson, ex-president of Smith College, has said: "I have a deep distaste for the esoteric vocabulary of self-conscious scholarship. Unnecessary hokus-pokus, I call it. The medical men have their lingo and now the sociologists are building up a terrible jargon, though I have yet to find in their books one idea which is not capable of being explained in standard English." *The New York Times*, commenting on the jargon coiners, remarked that it is always better to call a spade a spade than to call it an agricultural implement. And Winston Churchill, upon becoming Britain's Prime Minister, quickly ordered the Civil Service to replace its official jargon and pompous phraseology with simple language that would be easily understandable to the most uneducated person.

Mary P. Connolly, Director of the Health Education Division of the Detroit Department of Health, made a study some time ago of certain words and terms used by the department's employees in their work with the public. In this study, Miss Connolly undertook among other things to learn

Please address samples of printed matter, comments, or other editorial contributions to the editors at One Madison Avenue, New York, N. Y.



what the term "inciting agent" ("a sacred cow" to public health workers) meant to different groups served by the health department. The most interesting definition received came from a well informed woman who said the term "inciting agent" might be a Fuller brush man! Miss Connolly also learned from her study that mothers dislike such terms as prenatal and postnatal. It simplifies matters both for the health educator and the mothers to supplant these cold terms with such phrases as "before the baby comes" and "after the baby is born." It was also found that such terms as Schick test, Dick test, and tuberculin test, confuse parents. On the other hand, parents understood what the health educator meant when such terms as protective steps against diphtheria, scarlet fever, etc., were substituted.

Elma Rood has told of a health educator in Tennessee who undertook a sanitation project in a rural community. The health educator commenced his work by issuing instructions for the removal of all debris. He might just as well have addressed his public in a foreign language for debris was an unheard of word in the community. But results were obtained when families were re-

quested to clean up their property. Miss Rood also tells of retaining the old term "consumption" when working with the rural groups, because tuberculosis has not yet come to mean one and the same thing to them. For the terms pneumothorax and phrenicectomy, Miss Rood substitutes "air treatment" and "nerve operation." She believes that her public thereby more nearly comprehends.

It appears, therefore, that we can get along quite well without an extensive health education jargon. Let's do away with as much of it as possible—or else we may be the very group that will bring about the "word-burden legislation" mentioned in the *Journal's* February editorial.

#### BEST SELLERS

Uncle Sam—the nation's Number One publisher—continued his gargantuan output of pamphlets, booklets, periodicals, and other printed materials during 1939. Surprisingly enough, certain publications dealing with health were Uncle Sam's "best sellers." *Venereal Disease Information* ranked as one of the government's most popular periodicals. Among individual publications *Infant Care*, which is in demand year

#### MAGAZINE ARTICLES

Current popular magazine articles on health or of medical import:

- "Saving the Unborn." Gretta Palmer. *Ladies' Home Journal*. March, 1941.
- "Your Child Can Be Immune." Philip M. Stimson, M.D. *Parents' Magazine*. February, 1941.
- "Appendicitis." *Life Magazine*. February 24, 1941.
- "Obstacles Against Syphilis." Paul de Kruif. *The Readers' Digest*. March, 1941.
- "What You Need to Know About Vitamin." *Look Magazine*. March 11, 1941.
- "Pneumatic Fever." *Friday Magazine*. February 21, 1941.
- "Surgery in Mental Cases." Marguerite Clark. *The American Mercury*. March, 1941.
- "Total Defense and Public Health." James Rorty. *Harpers Magazine*. March, 1941.
- "Miles Better Safe." Doron Andrim. *American Magazine*. April, 1941.

The above is not presented as a complete list and the articles cited are not necessarily recommended.

in and year out, maintained its standing as the government's leading booklet. *Healthy, Happy Womanhood* and *You Can End This Sorrow* (a syphilis leaflet) ran up a total of nearly 600,000 copies each during 1939, while *Diets to Fit the Family Income* was not far behind.

Requests for health literature reach government agencies from all sections of the country, from all classes of society. It is rare indeed that the desired information cannot be supplied, but occasionally this does happen. For instance, no reply was sent to the following request: "Please send me photographs of vitamins, so I will know what to swallow and what to let alone."

#### EXHIBIT ENCYCLOPEDIA

At last there is available a book on exhibits that might be classed as a super-encyclopedia on the subject. This book, which we highly recommend, was recently published by the New York Museum of Science and Industry under the title "Exhibit Techniques." Health educators should place it on their "must" list of book purchases, for it will be an invaluable guide to those who are faced with the formulation of exhibit programs.

This book grew out of a survey conducted by the Museum staff during the 1939-1940 New York World's Fair. One hundred and thirty-six of the Fair's "most worth while" exhibits were studied. The resulting volume sets forth an exhaustive amount of data on all the technics and materials involved in exhibit construction and display. The proper utilization of space, light, plastics, water, murals, maps, puppets, panoramas, demonstrations, motion pictures, etc., are among the subjects dealt with. Line drawings of the exhibits discussed are also included and are most helpful.

The authors give an interesting definition of an exhibit and its purpose—to wit: "An exhibit is a short cut to

knowledge that is designed 'to make friends and influence people.' It must draw attention, create and sustain interest, and tell a story."

"Exhibit Techniques" may be secured from the New York Museum of Science and Industry, Rockefeller Center, New York, N. Y., or the Association Book Service, at a cost of \$2 per copy.

#### HEALTH IS NEWS

When health educators gather to "talk shop," there is one subject that generally comes up for discussion—namely, the attitude of newspaper editors toward material released for publication by health departments. Some editors welcome such press releases at any time, while others print them only when big stories are not breaking on the news front.

Conclusive proof that health information is newsworthy, even when stories of international importance may be crowding the press wires, was borne out recently by a leading New York City daily. By actual count there were eight articles on health and medical topics printed on the very day when Hitler's armies were on the move toward the Balkans. The lead story among the health items told of the work of New York City's district health centers. Other articles dealt with Sir Frederick Banting's discovery of insulin, the introduction of new forms of therapy in the New York Triboro Hospital for Tuberculosis, the correction of speech defects, the prevalence of measles, the introduction of short wave treatments for colds in England, and the dangers of rheumatic fever. Finally, a paragraph on public health was noted in an interview with the Duchess of Windsor who told of her interest in health conditions among the native population of the Bahamas!

If a great New York daily can devote several columns of space in a single

issue to health news, it should be relatively easy to induce editors in other localities to increase the coverage of health stories. Since it can be done—let's strive for more health news in the papers!

#### COPY COMMANDMENTS

*Advertising and Selling*, a trade journal, published in a recent issue an article by G. Lynn Sumner entitled "The Ten Commandments of Copy Writing." Since much of Mr. Sumner's advice can be applied to the preparation of health publications, we have revised his "commandments" somewhat in order that writers in the health field may follow them if they wish.

The "copy commandments," thus modified, follow:

1. Learn *all* about your subject before you write *anything* about it. Then material for your copy always will be a matter of selection, and in your copy, your knowledge always will be condensed—never inflated.
2. Organize your material. Get your information down in order, from the standpoint of the reader's interests—not yours.
3. Decide to whom you are writing. Remember, it is a person, not a circulation or a list. What you write will be read by one person at a time. You are writing a letter, not a speech.
4. When you are ready to write, keep it simple. That does not mean writing down to anybody. Simple language is easiest understood, longest remembered. Avoid high-flown phrases, "sweet wind."
5. Use meaningful words and phrases. If a picture is worth a thousand words, use words that create pictures in the reader's mind.
6. Don't try to be funny. To try and fail is tragic. Few people can write humorous copy and few health subjects lend themselves to it.
7. Make your copy specific.
8. Write to inspire confidence. If your reader doesn't believe you, nothing else matters.
9. Make your copy long enough to tell your story—and quit. No copy is too long if it holds the reader's interest. One sentence can be too long if it doesn't.
10. Finally, give your reader something to do and make it easy for him to do it. Tell him where to go for further information, or

tell him how he can cooperate with the doctor and health officer. Outline how he can join in a community activity aiming at better health conditions.

#### LECTURES FOR LAYMEN

The New York Academy of Medicine has long and ably served the medical and allied professions as a fountainhead of knowledge. Its services have been rendered through many channels that have extended the Academy's influence far beyond the borders of its own community. In fact, the Academy has become an institution of international repute. Many health workers have drawn upon its resources and a number of significant public health movements have been instigated as a result of interest on the part of the Academy.

The public relations program of the Academy embraces many features of concern to health educators. Among these are its information service, which releases much health education material, and its series of lectures for laymen which are given each year by authorities in various fields.

One of the most absorbing, challenging, and learned of these lectures was delivered recently by Alan Gregg, M.D., Director of Medical Sciences of the Rockefeller Foundation, on "Humanism and Science." This address has now been published by Columbia University Press and should be read by health workers everywhere, for the philosophy which Dr. Gregg sets forth can be applied not only to the practice of medicine and to medical research, but to public health as well. Dr. Gregg's paper contains an eloquent plea for an alliance of medicine with humanism. He maintains that the resources which the humanists have made available in literature and the other arts constitute an invaluable supplement to the practice of medicine, inasmuch as humanism enables the doctor to understand his patients.

Dr. Gregg's paper should not be marred by clumsy comment on the part of a reviewer. Perhaps a few quotations taken at random from it will convey some idea of the excellence of Dr. Gregg's statement, both as to content and style of writing:

"Science, the fruit of man's preoccupation with nature, must give place to humanism, the flower of man's experience with man."

"Disease has many facets. Pain, disability, and death make up the most obvious among them. But disease has other aspects—uncertainty, for example, or fear and shame and the distress at letting down one's fellow men. Indeed, it is these human aspects of disease which are the hardest to bear, for which we physicians are most poorly prepared and in which scientific medicine has least to offer."

"Some patients would rather be understood than x-rayed, and rightly so."

"The scientist's lens to observe is bright: Let not his mirror to reveal go unpolished!"

"Mankind has always been stirred more by resurrection than by birth."

"The commonest error of the scientist is to assume that he is master of all the variables in his equation."

The Academy's annual series of lectures are published each year. The various volumes are well worth owning.

#### MISCELLANEOUS HEALTH NOTES

The Tuberculosis and Public Health Committee of the New York State Charities Aid Association reports two new mortality "lows" of standing interest for the up-state area in 1940. It will be remembered that the first state-wide control programs in the fields of tuberculosis and diphtheria were initiated in this state. In 1940, the tuberculosis mortality rate reached a new minimum of 36.3 per 100,000, and the diphtheria death rate was 0.06. In this state also, the pneumonia control pro-

gram had one of its earliest beginnings, and the mortality rate of 45.4 for the up-state area represented a minimum for this disease as well. At the same time, new cases of syphilis reported in 1940 were 12,786, as compared with 14,282 in 1939—continuing a downward trend in spite of all efforts to increase diagnosis and detection, and apparently reflecting a reduction in the spread of this infection.

When we learned that Toronto, Ontario, had gone through the year 1940 without a single case of diphtheria, we assumed that this record would probably stand for a long time without sharp competition in Canada or the United States. However, we are now delighted to learn that America has a runner-up and a close competitor in the city of Newark, N. J. Health Commissioner Craster advises us that this city also went through 1940 with no cases or no deaths from diphtheria. While a little smaller than Toronto, it is certainly a top-notch accomplishment. Congratulations to Dr. Craster and his coworkers!

The bearing of recently developed therapeutic procedures on pneumonia control seems to be clearly demonstrated by current experience in Canada and the United States in the matter of the recent influenza-pneumonia outbreak, as judged by the mortality records among the industrial policyholders of the Metropolitan Life Insurance Company.

In all of the United States, with the exception of the Pacific Coast area, while the influenza mortality increased in January, 1941, over January, 1940, from 15 to 19.8 per 100,000, the pneumonia mortality decreased from 54.7 to 53.8 per 100,000. In the Pacific Coast area the influenza contrast was more marked, rising from 10.4 to 27.9 per 100,000, whereas pneumonia showed only a slight increase—38.4 to 45.1.

In Canada, in the Province of

Ontario, where serum treatment and chemotherapy have been carried out probably as thoroughly as in the United States, while the influenza mortality in January, 1941, showed an increase, as compared with 1940, from 2.7 to 29.7, pneumonia decreased from 46.6 to 39.0. In Quebec Province, on the other hand, influenza increased from 26.1 to 50.1 and pneumonia from 50.3 to 105.8.

#### NOTES ON NOTABLE PUBLICATIONS

"... but flu is tougher" is the catchy title of the first booklet to be issued in the Workers' Health Series. The Industrial Health Division of the U. S. Public Health Service is responsible for this publication and, if other booklets in the series are as cleverly done as this one, we shall have a succession of publications that "hit the bull's eye." "... but flu is tougher" is evidently the work of a new writer in the health field, since all the accepted patterns of health literature have been discarded for a fresh and original approach to the subject. The text tells of Chesty Bigbee, a modern Tarzan who, despite his ability to "take it," finally learned this moral: "Don't try to be tough with the flu, it is tougher than you."

The text is compact and informative and the illustrations can best be described by the overworked word "swell." The drawing on the cover, which shows Chesty clad only in his shorts and flexing his biceps, is certainly an eye catcher and a decided departure in illustrations for health literature.

This booklet will undoubtedly have a strong appeal for a masculine audience.

An annual report of unusual distinction is that of the Staten Island Social Service, Staten Island, N. Y. Printed in black and white, illustrated with excellent photographs, this report towers above the usual run of annual statements that come from health and wel-

fare agencies. It is the text, however, more than the format or photographs, that lends distinction to this publication. The writer employs a style reminiscent of Pare Lorentz, author of the memorable commentary for the film "The River." It is refreshing to come upon an annual report that says something in a different way. Upon reading this publication, one gets a lasting impression of Staten Island as a community, the character of its people, what problems they face, how they look, how they talk. Factual information about the organization is limited to the last two pages of the booklet. Congratulations are in order to Harald Lund, the author; Gay Dillon, the photographer; and to others who may have aided in the publication of this report.

In line with the growing interest in nutrition, the Department of Health of the City of New York recently devoted an entire issue of its periodical *Neighborhood Health*, to a comprehensive review of food and its relation to all age groups. This is a decidedly praiseworthy effort and the publication should be an important contribution to popular nutrition education.

The physical appearance of this publication is very attractive. Two colors are skillfully used in the illustrations and in certain decorative panels and backgrounds. The varied illustrative material includes photographs, charts, drawings, and cartoons—all of considerable interest and merit.

Publications devoted to nutrition generally make rather discouraging reading, in the estimation of the layman. The editors of *Neighborhood Health*, however, have succeeded in peppering up the subject and giving it a timely and popular appeal. Agencies planning nutrition material will find this publication exceedingly helpful as a guide as to what to tell and how to tell the public about food in relation to health.

## BOOKS AND REPORTS

### Books of Special Interest to Public Health Workers

MAZYCK P. RAVENEL, M.D.

*"A good book is the best of friends, the same to-day and for ever."*—MARTIN FARQUHAR TUPPER.

THE past year has been an interesting one. With so much of the world dislocated, fears were entertained for the output of books during the year. This has been better than expected, no doubt because a worth while book takes long to prepare and perhaps the great majority of those published and reviewed in 1940 were written during 1938 and 1939.

There has been perhaps an unusual number of shorter reports on various subjects, but there has been a good output also of worth while books.

In preparing this review the *American Journal of Public Health* has again been our main source of information. The other journals consulted have been chiefly the *Journal of the American Medical Association*, the *London Lancet*, and the *British Medical Journal*. Due probably to the arrangement that has been made by certain of our large American publishing houses with some in England, it is not unusual to find the same books reviewed in both English and American journals, and it is pleasant to note that the English, who apparently take book reviewing more seriously than many Americans do, have in a number of cases given more favorable reviews of American books than have the Americans.

As in former reviews, the comments on the books are taken from the published reviews. The substance has in no case been changed, though quotation marks have generally been omitted.

#### BIOGRAPHY AND HISTORY

There have been a number of delightful books on biography and history, two or three of which are unusual not only in their character, but in their permanent value. *Carlos Finlay and Yellow Fever*, by Carlos E. Finlay, Oxford University Press, is an excellent work containing translations from the Spanish of many of Finlay's studies on yellow fever, by his son. It is well illustrated and gives to the public for the first time in English much material which it should have had many years ago. The book is an important one and holds one's interest throughout. It gives also the family history of Carlos Finlay. *The Development of Public Health in*

*Canada*, edited by R. D. Defries, Canadian Public Health Association, is a most useful and interesting book, well planned, and well done. It is a foundation stone in the history of public health on the American continent. *History of the London County Council, 1889-1939*, by Sir Gwilym Gibbon and Reginald W. Bell, Macmillan, is a remarkable book—a storehouse of information for the student of history, public health, and social science wherever he may reside. It gives in an interesting and enlightening manner the organization, relationships, services, and significant achievements of a great organization which has exercised an important influence on the lives of the people of London, and

stimulated the development of constructive governmental activities elsewhere. *The Kosher Code of the Orthodox Jew*, by S. I. Levin and Edward A. Boyden, The University of Minnesota Press, is an unusual book, being the first time that the Laws of Terefah have been translated into English. One author is Professor of Anatomy of the University of Minnesota, and the other the Senior Orthodox Rabbi of Minneapolis. The book explains the customs of the Jews in regard to animal foods and also shows the contributions made by the Jewish inspectors to the gross anatomy of food animals. It is recommended for all libraries, and Rabbi Levin says it should be in the library of theological schools. It is an authentic guide for observers of the orthodox law. *A Mirror for Surgeons*, by Sir D'Arcy Power, Little Brown, is delightful, containing sketches of 22 great surgeons who have contributed to the advancement of surgery. *Panum on Measles: Observations Made During the Epidemic of Measles on the Faroe Islands in the Year 1846*, by Peter Ludwig Panum, American Public Health Association, is a classic made available in English by the Delta Omega Society to which we all owe a debt of gratitude. The observations of this modest Danish physician constitute a model of epidemiological study and recording. An indispensable book. *American Doctors of Destiny*, by Frank J. Jirka, Normandie House, contains a number of interesting personal sketches of doctors from the beginning of America as a country throughout the colonial period, with 21 portraits. Combined with the sketches of the doctors there is necessarily a good deal of medical philosophy as well as history. *Faiths That Healed*, by Ralph H. Major, Appleton-Century, is an interesting account of the various faiths and superstitions which have influenced, and still do influence, many sincere people as well as multitudes of

the ignorant. The author has made original studies concerning many of these and writes of them in a most interesting manner. The book is designed for the laity but can be recommended to the profession as well. *The Medical Career and Other Papers*, by Harvey Cushing, Little, Brown, is a collection of addresses and sketches published posthumously. All of them are interesting. The book is readable and a notable addition to the medical history of our times. *A History of Tropical Medicine*, by H. Harold Scott and H. Camb, Williams & Wilkins, has been prepared by the Director of the Bureau of Hygiene and Tropical Diseases of the London School of Hygiene and Tropical Medicine, who is well fitted to write such a history, and has made a valuable contribution to medical history. It should be widely used as a reference by individuals and libraries.

#### CHEMOTHERAPY AND SERUM THERAPY

Few more sensational discoveries have been made for many years than that of the chemical treatment of pneumonia. The discovery of prontosil was sensational, and valuable not only in itself but has led to the development of a number of new products which have practically revolutionized the treatment of various infections. We do not in our *Journal* go into treatment except where the therapy depends on bacteriological products, such as anti-toxin, or where there is direct chemical action on the pathogenic organisms. The new substances for the treatment of infections have appeared with startling rapidity, and it seems wise to mention the books which have been published concerning these developments. Among these are: *Chemotherapy and Serum Therapy of Pneumonia*, by Frederick T. Lord, Elliott S. Robinson, and Roderick Heffron, Commonwealth Fund. The tremendous advance in the

treatment of pneumonia due to the new chemical substances discovered and built up makes it necessary to mention this excellent book, which gives the result of ten years of study. The authors have made many fundamental contributions to the subject. They condense in a remarkable way the maze of scientific advances and give a concise, up-to-date summary of our knowledge of the pneumococcus, the diagnosis of pneumonia, and the various forms of therapy. *Pneumonia: With Special Reference to Pneumococcus Lobar Pneumonia*, by Roderick Heffron, Commonwealth Fund, completes the trilogy which has come from the Massachusetts Pneumonia Study and Service. It is an exhaustive study of 1,086 pages, which should be in every medical library. Another book which appeared in 1939 but was not reviewed until 1940, and which is constantly referred to by writers on the subject is *The Clinical and Experimental Use of Sulfanilamide, Sulfapyridine and Allied Compounds*, by Perrin H. Long and Eleanor A. Bliss, Macmillan. It is a fundamental contribution.

#### CHILD HYGIENE AND TRAINING

Child training and hygiene has not given us a great many books in 1940, though there have been a number of reports and short articles. *Child Training and Parent Education: References to Material in Recent Books*, by Lucile Reiner Stebbing and Caroline Shurtleff Hughes (2nd ed.), H. W. Wilson Co., contains a list of books which have been published within the last 15 years, and most of them within the last 10 years. The material has been well chosen and is of great practical value. *The First Five Years of Life—The Preschool Years*, by Arnold Gesell, Henry M. Halverson, Frances L. Ilg, Helen Thompson, Burton M. Castner, Louise B. Ames, and Catherine S. Amatruda, Harper, cannot be too highly recom-

mended. There is no other book that gives a more complete picture of normal growth and development in so compact a form. *Psychiatric Clinics for Children: With Special Reference to State Programs*, by Helen Leland Witmer, Commonwealth Fund, is well conceived and exceedingly well written, very helpful to all who are struggling to bring body, mind, and soul together in a topsy-turvy world. The times which we are going through make this study of especial value.

#### ENGINEERING

Many papers and reports have appeared, but few books have been sent in to us for review. Among these are: *Swimming Pool Standards*, by Frederick W. Luehring, Barnes, which is the history of swimming pools from ancient times to modern, after which there is a discussion of modern rules and regulations, ending with a list of 20 criteria for judging the standards. *Public Works Engineers' Yearbook 1940*, American Public Works Association, is recommended especially for governmental administrators, research bureaus, and libraries. The 1940 issue of this most important publication contains 338 pages. Attention is focused on both administrative and technical aspects of the subject.

#### HEALTH EDUCATION

Health education has been very much to the fore for several years. Many articles and some books have appeared. Among the best of these are: *Your Health Dramatized: Selected Radio Scripts*, by W. W. Bauer and Leslie Edgley, Dutton. Educators and health officers who are unfamiliar with radio production of professional quality can obtain from the script exchange of the United States Office of Education full lists of available scripts useful for health education. *Ways to Community Health Education*, by Ira V. Hiscock,



the Commonwealth Fund, is a coöperative project by five experienced persons. It lays stress on the importance of community organization for health education. It marks another step forward in a relatively new professional field. *School Health Problems*, by Laurence B. Chenoweth and Theodore K. Selkirk, Crofts, is a carefully prepared text, which, with its useful appendices and valuable reading lists, will be found valuable to teachers as well as to all engaged in public health work. *Good Health and Bad Medicine*, by Harold Aaron, McBride, deals with everyday medical ailments in which the temptations to self-medication are strong. The advice given is simple, practical, and in accord with accepted medical opinion. The information given is derived from standard government reports and official councils of the American Medical Association and the American Dental Association as well as the Agricultural Experiment Stations. It is written for the laity and is especially recommended for the home and for those engaged in the health education of school children and the public. *Non-Profit Hospital Service Plans*, by C. Rufus Rorem, American Hospital Association, contains a great deal of value to those interested in the subject of hospital service plans. It is recommended to hospital executives and trustees, members of social agencies, and others in the community who are interested in the economic aspects of hospital and medical care.

#### HOUSING

For several years housing has attracted more and more attention in other countries as well as America. *Introduction to Housing: Facts and Principles*, by Edith Elmer Wood, Washington: Superintendent of Documents, is the most valuable single reference work in the housing literature of the past five years. If there is any such thing as a one volume library on

housing, this book of 140 pages is it.

The housing problem is an acute one in this country and is rapidly being made much more so in many areas by the defense movement. A number of authoritative pamphlets and several books have appeared during the year which can be recommended along this line, and information concerning which can be obtained from the office of the American Public Health Association: *Can America Build Houses?* by Miles L. Colean; *The Homes the Public Builds*, by Edith Elmer Wood and Elizabeth Ogg; *New Homes for Old: Public Housing in Europe and America*, by William V. Reed and Elizabeth Ogg; *Homes: Front Line of Defense for American Life*, Survey Graphic; *Housing the Masses*, by Carol Aronovici; and *Housing for the Machine Age*, by Clarence Arthur Perry.

#### INDUSTRIAL HYGIENE

The recognition of the importance of industrial medicine and hygiene has been rapidly gaining in public health work for several years. The tremendous development of new chemical products of various kinds in industry has brought with it problems of public health and exposure. The efforts at preparedness now going on in our country have brought the whole question acutely to the front. The engineers are keeping up with the demand largely through papers, and there has not yet been time for the writing of many standard books on new developments. However, the interest in the general subject is shown by quite a list of books on various aspects of industrial health. *Medicolegal Phases of Occupational Diseases*, by C. O. Sappington, Industrial Health Book Company, is a valuable contribution on the subject, especially for physicians and public health officials. *Industrial Health—Asset or Liability*, by C. O. Sappington, Industrial Commentaries, is a balance sheet of the pros and cons

of industrial health, ending with the conclusion that industrial health work has paid and will continue to pay dividends upon whatever basis one may choose to calculate them—but the most important of these are human dividends. *Third Annual Symposium, Department of Industrial Medicine*—Northwestern University Medical School, Northwestern University, is a well conceived and virile contribution from one of the most extensive industrial centers in the world. *Fourth Saranac Laboratory Symposium on Silicosis*, edited by B. E. Kuechle, Employers' Mutual Liability Insurance Co., is an indispensable work in its field from which we gain the impression that this subject is gradually coming under control, with more of facts and less of theory. *Industrial Hygiene*, edited by A. J. Lanza and Jacob A. Goldberg, Oxford University Press, was written with the needs and viewpoints of the industrial physician in mind, and includes important ancillary features such as special therapy, nursing, compensation, health education, and is authoritative.

#### LABORATORY

The Laboratory Section of our Association has for years been among the one or two largest. There has been no cessation of activity on the part of laboratory men, but there has not been the output of laboratory texts that might have been expected. The following are worthy of especial mention: *Biological Products*, by Louis Gershenfeld, Romaine Pierson Publishers, a comprehensive discussion of biologicals, their production and standardization, well done, useful to teachers as well as students; and *Industrial Microbiology*, by Samuel Cate Prescott and Cecil Gordon Dunn, McGraw-Hill. This is an important new work which treats of the utilization of yeasts, bacteria, and molds for the production of industrially important or potentially valuable prod-

ucts. The recent advances in the fermentation industries and research are discussed. Of particular interest are the multitude of poisonous substances generated by fermentation. The book is of especial interest not only to the technical groups for whom it is written, but for laboratory workers in general and physicians in industrial centers where these fermentation processes engage workers in industrial or commercial procedures.

#### MENTAL HEALTH

Conditions in what appears to be a mentally sick world emphasize the importance of mental health and hygiene so long regarded by most of us as a specialty too difficult for the ordinary person to understand or even tackle. There have been a number of attempts to make the subject attractive and understandable to the average person, which have succeeded to a greater or less extent. Notable among the books of the year are: *Social and Biological Aspects of Mental Disease*, by Benjamin Malzberg, State Hospital Press, which shows much painstaking effort in production. It is recommended as a necessary text to all who would presume a responsible participation and knowledge in the field of mental health. *Beyond the Clinical Frontiers: A Psychiatrist Views Crowd Behavior*, by Edward A. Strecker, Norton, is one of The Salmon Lectures of the New York Academy of Medicine, and needs to be read and studied by many classes of society. It is not easy reading, not to while away an idle moment, but to gain some idea of what Mental Hygiene is doing to make this disturbed old world better to live in. *The Troubled Mind: A Study of Nervous and Mental Illnesses*, by C. S. Bluemel, Williams & Wilkins, is a worth while addition to the meager supply of nontechnical books much needed to enlighten the public in regard to the meaning and significance of one

of the major problems of medicine and public health. *A Handbook of Elementary Psychobiology and Psychiatry*, by Edward G. Billings, Macmillan, is intended primarily for the general medical practitioner and the medical student, but of value also to the specialist in mental and nervous diseases. It is an expertly prepared compendium of hard-won knowledge made comparatively easy for the busy practitioner, and is "worth its weight in therapeutic gold."

#### NURSING

Nursing, and especially public health nursing, continues to excite great interest everywhere, and properly so. Present conditions in our country will put unusual demands on the nursing profession. There is one book which we believe will be of especial interest in the emergency conditions which may develop: *Improvised Equipment in the Home Care of the Sick*, by Lyla M. Olson (3rd ed.), Saunders. It contains 419 illustrations of equipment with accurate directions for constructing and use. It is a practical and useful book, highly recommended. *Nursing in Sickness and in Health: The Social Aspects of Nursing*, by Harriet Frost, Macmillan, is an exceptionally helpful and timely book and all those interested in nursing education are debtors to the author. *Supervision in Public Health Nursing*, by Violet H. Hodgson, Commonwealth Fund, is by a public health nurse, eminently fitted by the variety and type of her experience to be a real authority, and the author has produced a most significant book on public health nursing which can be highly recommended from every standpoint. *Manual of Public Health Nursing* (3rd ed.), prepared by The National Organization for Public Health Nursing, Macmillan, is highly recommended for nurses working alone as well as for the staffs of public or private agencies. Whatever type of service a nurse may be engaged

in, assistance in solving problems will be found in the "New Manual."

#### NUTRITION

Nutrition studies have been worldwide, and the shadow of war which hangs over us has caused great activity along these lines. Among the books which have come to our attention are: *Food Control: Its Public Health Aspects*, by James Houston Shrader, Wiley, an excellent manual for the use of regulatory officers, food technologists, and students of the food industry, by one who has had extensive experience. It should be in the library of every regulatory official and every purveyor of food. *Milk and Nutrition—New Experiments Reported to the Milk Nutrition Committee, Part IV*, National Institute of Research in Dairying, 1939, contains excellent studies emphasizing the great value of milk for growth and health, showing also that raw and pasteurized milk have practically the same nutritive value for growing school children. *Vitamin D—Chemistry, Physiology, Pharmacology, Pathology, Experimental and Clinical Investigations*, by C. I. Reed, H. C. Struck, and I. E. Steck, University of Chicago Press, is a book of 389 pages on this vitamin which shows the importance in which it is held by students of nutrition. From every standpoint this is an authoritative, well written book, by authors known for their original researches in this field. In spite of the new material on vitamins being brought forward constantly, this book will hold the spotlight of public attention and scientific inquiry for many years. The American Medical Association has been publishing serially articles on the vitamins which are now collected and published in book form: *The Vitamins: A Symposium Arranged Under the Auspices of the Council on Pharmacy and Chemistry and the Council on Foods of the American Medical Association*, a volume

of 637 pages, brings the vitamin question up to date and gives additional evidence of the recognized importance of this group of substances by those interested in nutrition. The book is a must one for libraries and has a place on the shelves of private individuals interested in nutrition. During the World War the slogan was "Food will win the war." It has been said that in case of another war the slogan will be changed to "Vitamins will win the war." Certainly the present conditions brought about by preparedness which closely simulate war are making these subjects of immediate practical importance. *The Nation's Larder—Lectures at Royal Institution*, London, G. Bell and Sons, discusses food from historical, medical, agricultural, manufacturing, housewifery, and pediatric points of view. The more this book is studied the better.

#### ORAL HYGIENE

Oral hygiene is another more or less new branch from the public health standpoint. It will be remembered that we now have an oral group in our Association, showing the interest which is being taken in this important subject. During the past year a number of books have appeared which well deserve our attention: *A Survey of Mouth Hygiene Programs for School Children, Section V*, Cleveland Child Health Association, is the last volume of a most interesting study made under the direction of Dr. H. R. C. Wilson, of the Cleveland Child Health Association, covering respectively 13 cities of more than 500,000 population; 38 cities of 150,000 to 500,000; 42 cities of 100,000 to 150,000; and 98 cities of 50,000 to 100,000. It is a well done piece of work of great interest, especially from the standpoint of mouth hygiene but also of general health. *Radio Manual—A Compilation of Radio Broadcasts for Mouth Health Education*, Oral Hygiene Committee of

Greater New York, represents the thoughts and presentations of prominent dentists and health workers of New York, and is a significant addition to the field of public health education. *Dental Health Organizations in State Departments of Health of the United States*, U. S. Government Printing Office, does not attempt to compare the dental health programs of the various states, but gives an enormous amount of useful information of factual value. It is recommended as a guide and aid to those about to inaugurate such services. *Public Health Dentistry and Health Security. A text-workbook for students and practitioners*, by Alfred J. Asgis, Clinical Press, is prepared to give students of public health dentistry a conception of the aims and activities of dentistry and public health. There is need for the establishment of dental public health on a firm basis in every state and city health department, and this book is a practical outline which will prove useful to both teachers and students. *Teeth, Health and Appearance*, by Lon W. Morrey, Bureau of Public Relations, American Dental Association, is mentioned as showing the growing interests in oral hygiene. It has been approved by the American Dental Association and the U. S. Public Health Service. It is principally for lay reading and can be thoroughly recommended.

#### PUBLIC HEALTH

Under the heading of public health may be mentioned: *The Building of a Nation's Health*, by Sir George Newman, Macmillan. This is an unusual book by an unusual author, describing what was accomplished by the combination of statecraft and medical knowledge taking counsel together. It gives sketches of men like Edwin Chadwick, Sir John Simon, and William Farr, and the influence their work has had on public health of today. It is a valuable

contribution by an outstanding public health statesman which should be available to every student of public health. *Epidemic Encephalitis: Etiology, Epidemiology, Treatment*, Third Report by the Matheson Commission, Columbia University Press, is more than a mere review of published material on the ever broadening subject of encephalitis, but a comprehensive treatment of the sequence of discoveries in the field and in the laboratory, tied in with an impartial evaluation of clinical applications of such discoveries. *Health for New York City's Millions: An account of activities of the Department of Health of the City of New York for 1938*—with comparative vital statistics tables, by John L. Rice, New York Department of Health, is mentioned, since the health administration of New York City and New York State has for years had a marked influence on that of smaller cities and communities. Under Hermann M. Biggs, the City Department of Health led the world and successive officers of health have striven to rival his work—often with marked success. The book contains a lot of factual and statistical material as well as much interesting and valuable reading. *Brucellosis in Man and Animals*, by I. Forest Huddleson, A. V. Hardy, J. E. Debono, and Ward Giltner, Commonwealth Fund, is a necessary book for every library. The increasing recognition of the importance of undulant fever not only in this country but in various parts of the world makes this a most important contribution. It contains chapters on the distribution of the disease in the United States by Hardy, and in Malta by Debono, and one on control in the United States by Ward Giltner. *Virus and Rickettsial Diseases, with Especial Consideration of Their Public Health Significance*, by various authors, Harvard University Press, is the outgrowth of a symposium held at Harvard in 1939. It is up-to-

date and authoritative. For each subject discussed liberal lists of references are given. The book is indispensable to specialists in the field covered and of value to all interested in the infectious diseases. *Health is Wealth*, by Paul de Kruif, Harcourt, Brace, is a virile and entertaining book filled with food for thought, though the style of the author is rather exuberant.

#### TEXTBOOKS

*Medical Microbiology*, by Kenneth L. Burdon, Macmillan, is the outgrowth of another book by the same author intended primarily for nurses, and there is still evidence of the emphasis on the rôle of the nurse in the care of the sick and prevention of illness. It is a valuable textbook for teachers and students of bacteriology, especially when the subject is considered from the point of view of human pathology. *The Dysenteric Disorders—The Diagnosis and Treatment of Dysentery, Sprue, Colitis and Other Diarrheas in General Practice*, by Philip Manson-Bahr, Williams & Wilkins, although going into treatment, is included here since it treats of a major problem in practice, which is likely to be met with in this country in the near future. Diagnosis, which is difficult, is aided by an appendix on laboratory methods. The book should be available in libraries. Another book to be especially recommended is *Veterinary Bacteriology*, by I. A. Merchant, the Iowa State College Press, which treats primarily of the microorganisms causing animal diseases, but since so many diseases of animals can be transmitted to man, has great value from the public health standpoint.

#### VENEREAL DISEASES

The year has shown great activity in the study of venereal diseases, largely owing to the campaign inaugurated by our Public Health Service. Two useful books have appeared which can be

recommended: *Gonorrhea in the Male and Female*, by P. S. Pelouze, Saunders, is a book written in attractive style and copiously illustrated. It is an essential book for all who deal with infection either from the medical or public health standpoint. *Digest of Laws and Regulations Relating to the Prevention and Control of Syphilis and Gonorrhea in the Forty-eight States and the District of Columbia*, compiled under the direction of Bascom Johnson, American Social Hygiene Association, is a valuable compilation which should be available in all libraries.

#### NEW EDITIONS

The year has brought many new editions of successful books, and are here grouped. *Bacterial Metabolism*, by Marjory Stephenson (2nd ed.), Longmans Green, is a discussion of a complex subject which is attracting much attention—a well done piece of work, which is highly recommended. *Handbook of Bacteriology: For Students and Practitioners of Medicine*, by Joseph W. Bigger (5th ed.), Williams & Wilkins, is perhaps the most widely used textbook on the subject in England and Canada, and has been highly recommended in this country. Each edition has been better than the one before. *Handbook of Public Health Bacteriology and Chemistry*: General information regarding epidemiology, collection and shipment of specimens, and bacteriologic, serologic, and chemical procedures, Department of Public Health of San Francisco (2nd ed.), J. W. Stacey, Inc., is a most valuable textbook and can be recommended without hesitation. *The Sanitary Inspector's Handbook*, by Henry H. Clay (4th ed.), H. K. Lewis & Co., Ltd., is a most useful book of its type, which has proved it worth, each edition being acclaimed, especially in England, which is its home. It is recommended unreservedly as a practical guide and reference for officials and

as a manual for students. *Nutrition and Diet in Health and Disease*, by James S. McLester (3rd ed.), Saunders, is useful for physicians, public health officers, and all who are interested in nutrition as a potent factor in health. *Nutrition and Physical Fitness*, by L. Jean Bogert (3rd ed.), Saunders, covers a wide field and can be read profitably by anyone who wishes to know something of nutrition and its relation to health. *Stedman's Practical Medical Dictionary*, by Thomas Lathrop Stedman and Stanley Thomas Garber (14th ed.), Williams & Wilkins, can be recommended without reservation, not only for those who are trying to improve their medical vocabulary but also for editors, publishers, proof readers, abstracters, and all who have to do with medical literature. *The Care and Handling of Milk*, by Harold E. Ross (2nd ed.), Orange-Judd, has retained the same ideals as the first edition, is sound and authentic. It deserves a place in the libraries of all who are interested in dairying. *The Science of Psychology*, by Raymond H. Wheeler (2nd ed.), Crowell, has appeared. It would be perhaps too much to expect psychologists to agree with each other to a great extent, but the reviewer says that this work "represents on the whole, a somewhat more desirable trend in psychology from the point of view of organization, as well as from the point of view of its greater emphasis upon the reaction of the organism in its total personality setting." *A College Textbook of Hygiene*, by Dean Franklin Smiley and Adrian Gordon Gould (3rd ed.), Macmillan, is a useful book brought up to date, with new and effective illustrations, a glossary, and selected bibliography. *Textbook of Public Health*, by W. M. Frazer and C. O. Stallybrass (10th ed.), Williams & Wilkins, has been brought up to date but appears for the first time under its present authorship, having been previ-

ously known as Hope and Stallybrass. While it is written from the English standpoint it can be recommended for all students of public health in any country.

#### MISCELLANEOUS

*202 Common Household Pests of North America*, by Hugh Hartnack, Hartnack Publishing Co., is written especially for members of the pest control industry, but is of great value to the health officer and householder, especially in view of our increasing knowledge of the agency of insects in carrying disease. *Medical Climatology*, by Clarence A. Mills, Thomas, is of interest to students of the ecology of disease. The author emphasizes the importance of climatic factors on physiological activity and pathological conditions. The treatment is interesting but not entirely convincing. *Municipal Administration*, by John M. Pfiffner, Ronald Press, is a valuable study for the health worker who will find in this book a broad view of the coworkers in other fields which is sure to be at once stimulating and sobering. *Education of the Handicapped: Vol. II, Problems*, by Merle E. Frampton and Hugh Grant Rowell, World Book Co., meets an expressed need and should aid materially in clarifying our thinking with regard to the handicapped. It is one of a series from Teachers College, Columbia University. *A Doctor's Holiday in Iran*, by Rosalie Slaughter Morton, Funk & Wagnalls, contains much history of the country and customs but much also of recent development along social lines and in public health, brought about through medical missionaries primarily, aided

by the vision and active help of Shah Riza Pahlavi, who in 14 years has accomplished more than in 100 years preceding his rule. *Civil Service in Public Welfare*, by Alice Campbell Klein, Russell Sage Foundation, is especially timely and valuable because of the extension of civil service into the realm of public welfare. *Insect Pests*, by William Clunie Harvey and Harry Hill, H. K. Lewis & Co., Ltd., is interesting and useful, prepared primarily for the information of health and sanitary officials of the British Isles under the prevailing emergency conditions. Fumigation has been treated with special care. The book has one serious omission for use in the United States, since mosquitoes and the diseases carried by them are not mentioned. *Mosquito Control: Practical Methods for Abatement of Disease Vectors and Pests*, by William Brodbeck Herms and Harold Farnsworth Gray, Commonwealth Fund, lays emphasis on control as a sanitary and economic problem. For prevention of malaria many details in technic are inadequate.

While a great deal of care has been given to making this selection, we realize that judgments may differ and that we may not appreciate the particular needs of every reader. Further information concerning any of these books, as well as of many others, can be obtained from our Book Service Department in the New York office. Inquiries are always welcome from members as well as others and will receive careful attention from the Book Department.





quired a bathtub as early as 1803. Yet their sufferings from vermin, leaking cesspools, etc., show how long a way American hygiene had to travel during the last 130 years.

The booklet, with a preface by Dr. Malcolm Goodridge, president of the New York Academy of Medicine, is attractive. The papers, addressed to a lay audience, are written in a popular style.

OWSEI TEMKIN

**Hygiene: A Textbook for College Students on Physical and Mental Health from Personal and Public Aspects—By Florence L. Meredith, M.D. (3rd ed.). Foreword by Frank Howard Lahey, M.D. Philadelphia: Blakiston, 1941. 822 pp. Price, \$3.50.**

This volume represents an extensive revision in organization and content of the earlier text; only the chapters on principles of mental hygiene and on the self impulse have been retained. The section on anatomy and physiology has been condensed and a new section on the effective use of medical service has been added. The book is divided into 6 parts, with a total of 49 chapters, an appendix, and a useful bibliography. As stated in the preface, there is a dominating theme: health situations in life, health objectives arising from them, and appropriate action on the part of the layman, especially the college student. A stimulating foreword directs attention to illustrations of new advances in medical science.

The ambitious task of the author has in general been performed with success from the standpoint of clarity of presentation, of content, and of most of the illustrations. In spite of the scope of the sub-title, perhaps it is too much to expect that more space be given to community hygiene, preventive medicine, and public health, even at the expense of other material. It also seems unfortunate that in a text on hygiene, some 46 pages, dealing with communi-

cable and other diseases ("disorders of internal origin") of great importance from the standpoint of personal and public health, are set in type too small for easy reading, rather than serving as a model for sight conservation. Such limitations, however, are overshadowed by contributions to the subject of personal health which deserve praise.

IRA V. HISCOCK

**Plague on Us—By Geddes Smith. New York: Commonwealth Fund, 1941. 365 pp. Price, \$3.00.**

"Though laymen are the stuff of which epidemics are made, they shouldn't meddle with epidemiology, which is an exacting science." Thus begins the prologue of *Plague on Us*; and then this self-confessed layman proceeds, with an amazing neatness, to do something not yet accomplished by the professional in public health: he places epidemiology in beautiful perspective.

In the first part of the book, without dawdling or awkwardness, the author leads one down a sort of time avenue, through shadows of ancient pestilences and classic speculations, and out into the hard light of current epidemiologic discipline. Then biology, physiology, chemistry, and their subsiences; and environment, economic problems, speed of transportation, and other factors which bear upon the health of communities and nations, are examined as to their possible and probable rôles in the ebb and flow of disease in the mass: Why one man becomes sick and another does not. Why this disease or that spreads to a hundred persons or to a million persons, or doesn't spread at all. It is obvious that to undertake such a discussion one must be prepared for painstaking library research and the mental distillation of a formidable amount of material from diverse sources. That the author has not shunned such efforts is evidenced by the range and detail of his coverage, which,

literally, is from the Greeks to the protein molecule.

*Plague on Us* is not written as an epidemiologist would have written it, for no authoritative position is assumed, no particular thesis is set forth, no record of research or study of the author is reported. Actually, one is inclined at first glance to consider this presentation of epidemiology to be rather casual, and this impression is contributed to by the sly humor in some of the comments and footnotes. But more careful consideration brings one to a realization that this is not casual writing, but an unusual clarity and simplicity of style, an artistry of expression seldom achieved in discussing matters scientific. This is no mean accomplishment, and one is inclined to suspect that some part of Mr. Smith's mastery of language was acquired in his ordinary work of editing the manuscripts of physicians and health officers: a sort of reverse English.

Only once in a very great while do books like this appear. It is recommended to the thoughtful and intelligent layman. It is suggested as required reading in all introductory courses in epidemiology. It might well serve as a model of clean-cut expression.

*Plague on Us* was the principal selection of the Scientific Book Club for February.  
H. S. MUSTARD

**Food Values of Portions Commonly Used**—By *Anna dePlanter Bowes* (3rd ed. rev.). Published by the Author (311 So. Juniper St., Philadelphia), 1940. 31 pp. Price, \$1.00.

This book contains food value tables which give the values for the protein, carbohydrate, fat, calcium, phosphorus, iron and vitamin contents of practically all the foods used in this country. The values are based on the amounts of food as measured by household measures. As these amounts are correlated with the gram weight of the measures

it gives the reader the advantage of comparing portions with grams. These tables will be of distinct advantage to physicians and dietitians who are calculating diets for patients, as it is necessary to translate grams to household measures for the patient. The tables are conveniently arranged and the portions for which the food values are calculated are those most commonly used, so that the tables are practical and easy to use. ELAINE P. RALLI

**Photodynamic Action and Diseases Caused by Light**—By *Harold Francis Blum*. New York: Reinhold Publishing Corp., 1941. 309 pp. Price, \$6.00.

This monograph of the American Chemical Society series presents in readable form a wide range of information on a subject which cuts across many special fields of interest. It succeeds in its purpose of making the technical knowledge in this field intelligible to those whose activities may be along a wholly different line. The reviewer believes that many workers in public health will be surprised to find how closely their interests may be connected with other work which on the surface appears far afield.

There is included discussion of several diseases in domestic animals produced by light, and reviews of abnormal sensitivity to light in man, including sunburn, skin cancer, sensitization by substances coming into contact with the skin and by substances applied internally.

The American Chemical Society and the author are to be congratulated on a lucid exposition of a complex subject.  
REGINALD M. ATWATER

**Legal Guide for American Hospitals**—By *Emanuel Hayt, LL.B., and Lillian R. Hayt, M.A., J.D.* New York: Hospital Textbook Co., 1940. 608 pp. Price, \$5.00.

Since the publication in 1926 of

Lapp and Ketchum's book on *Hospital Law*, there has been no comprehensive, up-to-date text on this important subject. The present volume is, therefore, welcome not only as a much needed contribution to proper hospital administration, but as a very thorough and authoritative presentation of practically all the legal matters with which the modern hospital administrator may be confronted. In the preparation of this well written and well printed book, the authors have also had the collaboration of the Council on Government Relations of the American Hospital Association.

Much of the book is, of course, devoted to discussions of various aspects of liability, including the liability of public, private, and charitable hospitals for and to their medical, nursing, and pharmacal staffs, and the legal responsibilities pertaining to employees, patients, visitors, and the community. Other topics discussed include hospital organization and management, legal status of records, cadavers, taxes, accounts, insurance, workmen's compensation, labor relations, and abortions, contraception, and sterilization. A useful feature of the book is the digests of state legislation on many of these subjects. There is also an extensive table of cases, and a good index.

This book should be of value to all hospital administrators and their attorneys, to physicians, and to all public officials who are in any way concerned with hospitals. JAMES A. TOBEY

An Introduction to the Microbiology of Water and Sewage for Engineering Students.—By P. L. Gainey. Minneapolis: Burgess Publishing Co., 1939. 283 pp. Price, \$3.00.

This is the effort of an experienced teacher to acquaint the engineer student with the fundamentals of microbiology as these affect problems encountered in water and sewage treatment.

The first portion presents the situa-

tion, and deals with the details of study and of such subsequent treatment as may be required. Very fortunately, the language used is that of a master-teacher, who evidently knows how to explain, for the discussions are clear-cut and definite.

The second portion of 61 pages provides 45 well chosen exercises designed to impress the student with the necessity of learning to do by doing, and to equip him with a first-hand experience which is invaluable to the engineering student who may be confronted later by a biological problem.

The spiral ring binding and the large 8" x 11" pages facilitate use in the laboratory.

The book is decidedly concise. The reviewer is inclined to criticize it mildly on this score. For example, only very brief mention (p. 56) is made of the apparent toxic effect, on live stock, of certain blue-green algae.

Throughout there is a sustained effort to introduce the non-biologist or the non-chemist to the impressive array of biological factors which are strategically interrelated in water and in sewage with the physical and the chemical situations meantime.

It is unfortunate that this book, possessed as it is of real merit, should be marred by a number of errors. Among those noted by this reviewer are the following:

Page 7—"18 mm." is not the *thickness* of a coverglass, but (apparently) its diameter. 45—Size of protozoa . . . up to about 200 mm. (This is 8 inches.) Does the author mean microns? 47—"fact should not be lost site of . . ." Should it not be *sight of* instead of *site*? 64—(k) *Sinuuous* in place of "sinuous"? 129—Paragraph 3, last line: substitute *Cyclotella* for *Clycotella*. 134—Paragraph *Tabellaria* instead of *Taballaria*. 131—In column, *Chlorine*, are amounts given in p.p.m. or in lbs. per million gallons? 152—Paragraph 3, line 3.

Corixa instead of Corexa. 154—Last paragraph, line 4. Quietly instead of quitely. 158—Paragraph 2, line 2, word 5. Reversed instead of reserved. 193—Final paragraph, 13th line. Rat-tail maggots instead of "red-tail."

W. C. PURDY

**Biological Stains**—By H. J. Conn. (4th ed.) Geneva, N. Y.: Biotech Publications, 1940. 308 pp. Price, \$3.00.

The fourth edition of this book differs from the third mainly in the additional descriptions of 13 dyes not previously included and in bringing up to date all statements. A detailed review is not necessary since the book is familiar to all laboratory workers using biological stains. There is no other reference source where chemical formulae and staining methods are so readily available. The author has done a real service both to research workers and practical technicians.

JOHN F. NORTON

**Introduction to Parasitology: With Special Reference to the Parasites of Man.**—By Asa C. Chandler, M.S., Ph.D. (6th ed. rewritten and enlarged). New York: Wiley, 1940. 690 pp., 309 figs. in text. Price, \$5.00.

This textbook was first published twenty-two years ago under the title "Animal Parasites and Human Disease." It was originally intended for a wide range of intellectually curious readers but it was so enthusiastically accepted as a textbook in parasitology for colleges, universities, and medical schools that subsequent editions were rewritten and expanded until it is now a comprehensive textbook in the field of human parasitology. Unlike most textbooks in this field, it includes a section on spirochetes and spirilla which adds to its value, since this group of organisms is so closely related in many respects to the animal parasites.

In addition to the parasites of man,

reference is made to the related parasites of domestic animals. The present edition also contains outlines of the classification of parasites, making clearer their zoological relationships. There are also simple keys for the identification of the important arthropods. Each parasite is dealt with from the point of view of its morphology, life cycle, relationship to disease, treatment, and prevention. Throughout the book the most recent advances in our knowledge of parasites have been added.

One of the most commendable features of the book in all its editions has been the interesting manner in which the subject is presented, thus making it attractive to elementary students. The book is profusely illustrated with drawings and a few photographs of parasites and their relationship to disease. It should receive an enthusiastic reception by teachers and students of parasitology and by public health workers.

HENRY E. MELENEY

**A Surgeon Explains to the Layman**—By M. Benmosché, M.D. New York: Simon & Schuster, 1940. 317 pp. Price, \$3.00.

The author has himself given the best summary description of the book. In the introductory chapter, he writes, "On the whole, this book is a potpourri." And so it is! It is a potpourri of anatomy, physiology, pathology, symptomatology, diagnosis, and descriptions of operative technics. The author feels justified in concocting these elements in the belief that he may thereby "dispel—through greater understanding—that unnecessary and heartbreaking fear that surrounds the word 'operation.'" The book is then a sort of Cicerone for past and prospective surgical patients. The author tells us that he has often described the more common operations to curious patients with the help of simple sketches scribbled on prescription blanks. In this

book, he has collected a variety of sketches describing the major operations the surgeon performs. An introductory chapter is devoted to the tools of surgery, chiefly anesthesia, and surgical instruments.

The scope of this work is vast; its objectives are ambitious. To cover so much ground, the author is obliged to condense his statements of the facts almost to the point of grotesqueness, and to employ bizarre analogies.

The book is unfortunately peppered with journalese jargon. Hypodermic medications are "shot," not injected. The medical world, we are told, "was aflame with the implications of the new discovery." The early microscopists used "toy microscopes." Avertin is converted from a useful anesthetic to "a routine procedure." There are, too, a number of errors in the factual data presented. To cite a few, the author rather feelingly but erroneously states that, "surgery has burst from a dark medieval era into the modern era within fifty years." (May the shade of John Hunter forgive him!)

Many of the "diagnostic-scopes," and not as the author states "one," are utilized in surgical treatment. It is not correct, as the author writes, "that not a single Caesarean section had been performed previous to 1793 in which the mother lived." There is a record of one having been successfully performed in 1500. And even a surgeon should know better than to state that, "the principal job of the skin is to excrete poisons from the body through the pores."

Withal, the lay reader is bound to get from this book some reassurance and something of an idea of what the surgeon does when he operates.

IAGO GALDSTON

**Penny Marsh Finds Adventure—In Public Health Nursing—By Dorothy Deming, R.N.** New York: Dodd, Mead, 1940. 236 pp. Price, \$2.00.

This volume is intended to interest and inform girls and young women about the profession of public health nursing. It is a companion book to the author's *Penny Marsh: Public Health Nurse* and *Penny Marsh: Supervisor of Public Health Nurses*, and, in very readable style, tells the story of a rural public health nurse. The information is sound, the vehicle well chosen for this age group, and the total effect on the young reader such as to intrigue the better and more adventurous. An excellent selection for the high school vocational bookshelf.

R. M. ATWATER

**Preventive Medicine—By Mark F. Boyd, M.D., M.S., D.P.H. (6th ed.).** Philadelphia: Saunders, 1940. 588 pp. Price, \$4.50.

The sixth edition follows the general pattern of the previous edition with only the revision and additions obviously necessary in the rapidly developing field of preventive medicine. The author's foreword indicates that the intention of the volume is to present, "... a minimum knowledge of the subject which a student of medicine should be expected to possess." The limitations necessarily imposed by an attempt to cover the entire field of preventive medicine in a single small volume are obvious, but one might question the wisdom of the relative emphasis placed upon environmental sanitation, especially since this emphasis is apparently at the expense of some of the more important problems in preventive medicine and public health, notably, tuberculosis, syphilis, pneumonia, and mental hygiene.

The revision and expansion of the section on deficiency diseases constitutes a valuable addition to the new volume. This edition, in common with most textbooks covering the large field of preventive medicine, provides a basis of subject matter. For detail, one must

refer to the more exhaustive monograph type of discussions. The reader will not find the completeness and authoritative detail found in the author's textbook on malariology.

The printing and form of the book are excellent, and the text is adequately illustrated, although some of the illustrations have become somewhat outdated. The absence of detailed references is understandable in view of the wide variety of subjects briefly treated. General reference material is given as an appendix. ERNEST L. STEBBINS

**A Surgeon's Life—*The Autobiography of J. M. T. Finney.* New York: Putnam, 1940. 396 pp. Price, \$3.50.**

Sincere autobiographies are always interesting. In the case of this book we have the story of a man who has much to tell and who knows how to tell it. The author has been prominent in the surgical life of this country for 50 years and in the social life of one of our most charming cities for the same length of time. He has been connected with three great universities—Princeton as a student in Letters, Harvard as a medical student and while resident at the Massachusetts General Hospital, and finally Johns Hopkins in the Medical School and Hospital. In each of these fields he has been prominent. He played football at both Princeton and Harvard. During the tenure of Woodrow Wilson as President of Princeton, he was on the Board of Trustees, and his close association with Wilson was very useful during the World War, especially in the appointment of a Surgeon General of the Army.

It is impossible to mention more than a few of the many notable incidents recorded, nor can one even begin to enumerate the many great and near-great with whom the author has been associated and of whom many delightful personal sketches are given.

The story of the use of rubber gloves

in surgery is interesting. Caroline Hampton, of South Carolina, was the head nurse in the Johns Hopkins Hospital operating room. She suffered very much from the antiseptics which necessarily came in contact with her hands, and her condition finally got so bad that she could no longer carry on. Everybody had noticed the great attraction between Dr. Halsted and Miss Hampton personally as well as professionally. Seeing that Dr. Welch had rubber gloves which he was using for post-mortem work, Dr. Halsted had a pair of rubber gauntlets made for Miss Hampton, which protected her hands and enabled her to continue her service. One day Dr. Bloodgood observed that if gloves were so good for the nurse why shouldn't the surgeon also use them. Thin gloves were made and came into use in the hospital, and from this it has become the practice everywhere for surgeons to use rubber gloves for operating.

Dr. Finney's ancestors were Scotch-Irish on one side, and sturdy English on the other, "long-lived, God-fearing, well educated and public spirited." Throughout his career he has been a consistent member of the Presbyterian Church, holding a number of prominent positions, and it is evident that this religious attitude in its best form has influenced and tempered his life. He stresses the importance of regarding each patient as an individual entity, and the value, even in the treatment of disease, of an insight into the character of a patient, the workings of his mental processes, and his spiritual aspirations. He quotes with approval Trudeau's definition of the true province of the doctor, "To cure sometimes, to relieve often, to comfort always."

We wish that space allowed a longer review of this charming book. While it can be recommended unreservedly for general reading and for those entering or in the medical profession, we suspect

it will be of especial interest to the graduates of Harvard, those who served at Massachusetts General Hospital, and of the Medical School of Johns Hopkins and its Hospital. The intimate sketches are charming and well done. Apart from such features, there is a chapter entitled, "The Medical World," which contains a good deal of philosophy, study of life in general, and voices the questioning that is going on in everyone's mind today. "What an indictment against present-day civilization that it is possible in this day and generation for the world to find itself in such a chaotic state, largely because of the 'delusions of grandeur' of certain misguided individuals, aided and abetted by the greed of lawless dictators!"

The book ends with a chapter, "In Retrospect," in which he again stresses the duty of the doctor, surgeon, or physician, in making the welfare of the patient the prime consideration around which the whole practice of modern medicine and surgery revolves. The author does not make light of the anxieties and physical strain to which the doctor is subjected or the tension to which his family, especially his wife, is often subjected. "The true physician is supremely happy in his work. . . . Once having caught the vision as it unfolds before his gaze, all else fades into insignificance."

It is a satisfaction to be able to say that Dr. Finney is still in prime good health, and to wish him many more years of a life which has been devoted so largely to the welfare of his fellowmen.

MAZÏCK P. RAVENEL

**Youth Looks at Cancer**—By *The Westchester Cancer Committee*. Brookville, N. Y.: Brookville Press, 1940. 55 pp. Price, \$.75.

This small well bound book is designed to supplement biology teaching in secondary and college classes to the end that the nature of cancer may be

more clearly understood. The motivation throughout is to provide a better understanding of what cancer cells are, what causes them, stimulates their growth and activity, and retards or stops this activity. The fear motive is certainly not a part of the picture. The emphasis is on the biological approach "to realize fully that cancer is the result of a fundamental change in the physiology of the cell," and that modern science now knows some ways of coping with these "mad" cells.

The reviewer believes that in this text biology teachers will find materials useful in arousing students' interest in cell construction and growth and an understanding of these processes. Carefully edited so that the vocabulary is within the range of students and the style dramatically simple, it is well adapted for supplementary reading.

Excellent photographs illustrate the text, no one of which can be censored as contributing to reactions of fear or revulsion. Each is intrinsically interesting. A good list of test questions, some suggestions for classroom, laboratory, and field studies, and a well chosen bibliography are included.

DOROTHY B. NYSWANDER

**Attaining Womanhood**—By *George W. Corner, M.D.* New York: Harper, 1939. 95 pp. Price, \$1.00.

This is a very helpful series of talks to girls of high school age about sex and reproduction. The material is presented in a straightforward and frank manner, keeping to the scientific facts of modern biology and medicine. It is illustrated with a number of line drawings. The chapters on sex attraction and sex conduct are especially well written and should prove very helpful to adolescent girls. The book can be recommended without reservation to be placed in the hands of young girls who are seeking answers to many questions relating to sex life. RICHARD A. BOLT

**A Guide to Human Parasitology for Medical Practitioners**—By D. B. Blacklock and T. Southwell. (4th ed.) Baltimore: Williams & Wilkins, 1940. 259 pp.; 122 ills., 2 colored plates. Price, \$4.00.

This book continues to be, as were the previous editions, a concise resumé of the internal parasites of man. As in previous editions the spirochetes are included since, as the authors say, they "were formerly classified with the protozoa, but are now considered more akin to the bacteria." There is no section on the arthropod external parasites but there are a few pages devoted to myiasis and, of course, the insect vectors of parasitic infections are mentioned as each infection is considered.

This edition follows the identical pattern of the previous editions. Actually, there is but slight change in detailed information, and this in only a few places. Thus an opportunity was missed to bring the classification up to date. Likewise a number of errors were continued, some of which may be noted: *Trichina* larvae are said to be discharged into the blood (instead of lymphatics); the daughter sporocysts are omitted from the life history of trematodes with no redia; flies and drinking water are listed as important means of transmitting many parasitic infections, including worm infections which require much more gross and direct methods of transfer; eggs of *Trichuris trichiura* are said to retain their viability for 5 years (rather than a few months); sedimentation is said to be more accurate than salt flotation for finding hookworm eggs in feces (whereas the reverse is true).

On the whole, however, the authors are to be congratulated on the degree of accuracy obtained in condensing the subject matter. Even their unequivocal handling of controversial subjects seems reasonable for a book of this type. They presuppose no parasitological background on the part of the reader

and have given more than an average amount of introductory material, simplified and condensed that subject matter, and included an extraordinary amount of summary review material. This latter takes the form of indented point summaries, simple tables, and pictorial sketches.

The book is particularly adapted for self instruction and review by physicians removed from parasitological and medical centers. It is not, and not intended to be, a reference book for the more intense student of parasitology.

G. F. OTTO

**In a Minor Key: Negro Youth in Story and Fact**—By Ira DeA. Reid. Washington: American Youth Commission, American Council on Education (744 Jackson Place), 1940. 134 pp. Price, \$1.25.

Here is a clear-cut factual presentation of what is happening to Negro youth in this country. It will prove helpful to all those who desire a basis of fact upon which to form judgment of what should be done about the many problems arising in this minority group.

Without bias and with a balanced viewpoint the author has presented his material in a number of chapters dealing with Negro health, welfare, recreation, housing, relief, work, and crime. A series of telling charts adds to its value. The chapter on "Planning for Survivors" gives a systematic presentation of what federal and private agencies are doing to promote inter-racial welfare. The book concludes with "Authorities for the Facts" which gives references to all the important material utilized in the various chapters.

RICHARD A. BOLT

**Sex in Development.** *A study of the growth and development of the emotional and sexual aspects of personality together with physiological, anatomical, and medical information on a group of*



*153 normal women and 142 female psychiatric patients—By Carney Landis and (nine) Associates. Foreword by Nolan D. C. Lewis. New York: Hoeber, 1940. 329 pp. Price, \$3.75.*

The comparative case study was conducted by means of carefully prepared interviews in which the subject was in each case asked the same questions as nearly as possible in the manner of a clinical consultation. The workers are aware of the limitations of the methods used. The results appear of value, as intended, for basic educational and research purposes, rather than for any immediate prospect of therapeutic application. The findings are largely negative in that they fail to support unequivocally either the theories that attribute mental disorders to childhood complexes and fixations, or those that assume physical correlates for every mental deviation. On the other hand, they add to our understanding of personality development as influenced by educational and experiential factors among "normal" individuals in ways that are significant in our concern for social and personal adjustments.

BENJAMIN C. GRUENBERG

*Emotional Hygiene: The Art of Understanding—By Camilla M. Anderson (2nd ed. rev.) Philadelphia: Lippincott, 1940. 253 pp. Price, \$2.00.*

This is a second edition of a popularly written volume which appeared first in 1937. Its author is a psychiatrist who has lectured to students in the department of nursing education at the University of Pennsylvania, and who addresses this volume chiefly to nurses. The language is simple, the illustrative episodes sometimes peculiarly apt, but there is hardly enough meat here for those searching for much help in this field. Certainly the chapter devoted to the problems of the public health nurse is inadequate. The book is more helpful as a stimulus to further reading and

to understanding the shortcomings of one's self and one's neighbors—the purpose for which it was written. Only minor changes, according to the author, have been made from the text of the first edition, and only the new chapter entitled "That Feeling of Sureness" has been added.

LEONA BAUMGARTNER

*Community Hygiene—By Elizabeth Sterling Soule and Christine MacKenzie. New York: Macmillan, 1940. 218 pp. Price, \$1.75.*

The authors of this very brief volume state that "from several years' experience it has seemed most effective to use a simple text enriched by wide reading assignments" in the teaching of public health to students in physical education, home economics, and nursing. Their book can be recommended for just such a purpose. The reviewer has used it recently to give a preliminary "bird's-eye" view of the range of the public health movement to sanitarians receiving special university training on the "short course" basis.

From the first chapter, which describes the history of public health, through the last chapter, which deals with the administration of public health services, most of the important aspects of the modern program are touched upon. Thus the intervening chapters are entitled, The Sanitation of the Food Supply, The Water Supply, Sewage Disposal, Housing, The Control of the Communicable Diseases, Community Health Problems in Relation to Maternity, Infancy, and Childhood, Programs More Recently Instituted by Official Health Agencies.

Condensation of so much subject matter in 218 small pages, inclusive of bibliography and index, is a difficult task, but on the whole the authors have chosen and treated their materials wisely.

MILTON ROSE

**Child Psychology for Professional Workers**—By Florence M. Teagarden, Ph.D. New York: Prentice Hall, 1940. 641 pp. Price, \$3.25.

This is not a book for popular reading. It is, as the sub-title indicates, for professional workers. A volume of some 600 pages, it is encyclopedic in scope planned especially for those concerned with fundamental problems of child care and training. The author is convinced that "professional workers need to know much about normal children." In dealing with abnormal children a basis of normal child psychology is essential.

The introductory chapters of this informative volume deal with principles of heredity and the application of this knowledge. These are followed by chapters on prenatal development, infancy, and the preschool child. The relation of the child to its home environment is treated in considerable detail and a number of helpful references in the literature are given. The chapters which follow deal largely with technical matters bearing upon the child's emotional life, sex, intelligence, behavior, etc. The bearing of the psychological and social problems upon the physical health and defects of the child is well set forth.

This volume should fill a place in the reference library of public health nurses, social workers, public health officers and others. RICHARD A. BOLT

**The Doctor and the Difficult Child**—By William Moodie, M.D., F.R.C.P., D.P.M. New York: Commonwealth Fund, 1940. 214 pp. Price, \$1.50.

This excellent book should be welcomed, not only by the harried parent but particularly by the pediatrician whose practice during many years has included a steadily growing proportion of "difficult children."

It is the general practitioner or the pediatrician who is first consulted about the problem, the psychiatrist being as

a rule called *in extremis* only, for the induction of the psychiatrist brands the child as a "mental case." The average doctor has a considerable store of practical knowledge gleaned from long experience in the supervision of such cases, but too often he fails to use his knowledge to advantage. This knowledge does not exist in usable form because he is confused by the conflicting nomenclature of psychiatry.

Dr. Moodie has avoided ponderous terms and hair-splitting definitions. His approach to his subject is direct, matter-of-fact and couched in everyday terms which reassure parent and doctor alike. What is more helpful, he considers the difficult child not just as a show-window for interesting psychological phenomena but as a human being who is unsuccessfully trying to adjust himself to his environment.

The book is well arranged, and the case histories are in general instructive. The chapter on treatment, which is particularly well executed, is full of helpful suggestions. BENJAMIN TAPPAN

**Safe and Healthy Living**—By J. Mace Andress, Ph. D., I. H. Goldberger, M.D., Marguerite P. Dolch, Elizabeth B. Jenkins, and Grace T. Hallock. New York: Ginn, 1939.

Spick and Span. 142 pp. Price, \$.64.

The Health Parade. 168 pp. Price, \$.72.

Growing Big and Strong. 237 pp. Price, \$.76.

Safety Every Day. 235 pp. Price, \$.76.

Doing Your Best for Health. 264 pp. Price, \$.80.

Building Good Health. 274 pp. Price, \$.84.

Helping the Body in Its Work. 282 pp. Price, \$.84.

The Healthy Home and Community. 298 pp. Price, \$.88.

As a set of tools to be used by a

skillful teacher in the elementary grades and in junior high schools, this series of textbooks is excellent.

The thoroughly sound scientific information and stimuli to the formation of desirable habits which the authors seek to teach is delivered in an attractive package. The illustrations are always purposeful and often beautiful. Attention has apparently been given to the principles of design as well as to the psychology of color. Legends and captions are apt.

The books are not just a set of readers. They are aids to learning—learning important facts, to forming strong habit, and to developing favorable attitudes. In addition to health information which is zestfully and systematically written, the books contain intriguing problems, things-to-do, reference lists, and usable vocabulary lists which have been planned and evidently tested by teachers who know how children learn. The unit system of organization is followed in each volume; the spiral technic is utilized in the plan of the series. The early and frequent emphasis on dental health, immunization, and accident prevention is noteworthy and commendable. An even more important consideration is that the authors have recognized the fact that children of ages 12 to 14 years have horizons broad enough to include participation in community public health practices.

The set of books could be used as the basis for an eight year course in health instruction in that term's widest and most constructive meaning.

A. P. HITCHENS

*As the Twig Is Bent—By Leslie B. Hohman, M.D. New York: Macmillan, 1940. 291 pp. Price, \$2.50.*

"I am convinced beyond doubt that the psychologic equipment with which we meet the world as adults is almost entirely the result of habit training be-

tween the day of birth and the dawn of adolescence." This quotation from Dr. Hohman's book indicates its basic principles. It is evident that he pins his faith to "Nurture" rather than to "Nature." The book is well sprinkled with case histories illustrating the successful handling of difficult children. One criticism might be that the treatment applied is too uniformly successful; the failures seem to have been forgotten.

Parents will undoubtedly enjoy reading this book. Its literary style is very pleasing and its air of authority will hearten the inexperienced or discouraged mother. But the ultra-modern educator whose shibboleth is "Creative Expression" will look down his nose in stern disapproval of the author's ideas on child guidance. That will probably not worry the author at all.

The book's format is good and there is an adequate index.

MERRILL E. CHAMPION

*The Girl Today—The Woman Tomorrow—By Lucretia P. Hunter (rev. ed.). New York: Allyn & Bacon, 1939. 374 pp. Price, \$1.20.*

This book is designed as a handy textbook for high school girls based upon modern educational methods. It is the outcome of extensive classroom experience in instructing adolescent girls in social behavior. The text is clearly written and profusely illustrated. High ideals of conduct are presented concisely and attractively.

The general impression given in the text and illustrations is that the appeal is to girls of the upper social and economic levels. It is difficult to conceive how young girls brought up in poor families or even in those homes with modest incomes could afford many of the articles portrayed. An extensive bibliography is given at the end which might help in securing a balanced viewpoint.

RICHARD A. BOLT

## BOOKS RECEIVED

- STRANGE MALADY. THE STORY OF ALLERGY. By Warren T. Vaughan. New York: Doubleday, Doran, 1941. 268 pp. Price, \$3.00.
- MANUAL OF CLINICAL CHEMISTRY. By Miriam Reiner. New York: Interscience Publishers, 1941. 296 pp. Price, \$3.00.
- THE PARASITES OF MAN. By Thomas W. M. Cameron. Toronto: University of Toronto Press, 1940. 182 pp. Price, \$3.00.
- WHEN CHILDREN ASK. By Marguerite Harmon Bro. Chicago: Willett, Clark, 1940. 267 pp. Price, \$2.00.
- WHAT PRICE ALCOHOL? Robert S. Carroll. New York: Macmillan, 1941. 362 pp. Price, \$3.00.
- SEWAGE TREATMENT. By Karl Imhoff and Gordon Maskew Fair. New York: Wiley, 1940. 370 pp. Price, \$3.00.
- MENTAL HEALTH IN THE CLASSROOM. Thirtieth Yearbook, Department of Supervisors and Directors Instruction, National Education Association, Washington, D. C., 1940. 304 pp. Price, \$2.00.
- DIAGNOSTIC PROCEDURES AND REAGENTS. Techniques for the Laboratory Diagnosis and Control of the Communicable Diseases. New York: American Public Health Association, 1941. 352 pp.; Index, 16 pp. Price, \$2.75.
- PERIODICITY AND CAUSE OF CANCER, LEUKAEMIA AND ALLIED TUMORS. By J. H. Douglas Webster. Baltimore: Williams & Wilkins, 1940. 178 pp. Price, \$3.50.
- BIOLOGICAL ASPECTS OF INFECTIOUS DISEASE. By F. M. Burnet. New York: Macmillan, 1941. 310 pp. Price, \$3.75.
- COMMUNITY HYGIENE. By Laurence B. Chenoweth and Whitelaw Reid Morrison. 2nd ed. New York: F. C. Crofts, 1941. 317 pp. Price, \$2.60.
- AMERICA ORGANIZES MEDICINE. By Michael M. Davis. New York: Harper, 1941. 335 pp. Price, \$3.00.
- WHAT ARE THE VITAMINS? By Walter H. Eddy. New York: Reinhold, 1941. 247 pp. Price, \$2.50.
- THE WOMEN'S DIVISION NATIONAL AMATEUR ATHLETIC FEDERATION. By Alice Allene Sefton. Stanford University Press, 1941. 87 pp. Price, \$2.00.
- AGE MORPHOLOGY OF PRIMARY TUBERCLES. By Henry C. Sweany. Springfield: Thomas, 1941. 265 pp. Price, \$5.00.
- HEALTH, SAFETY, GROWTH SERIES. By C. E. Turner, Juanita McD. Melchior, Grace Voris Curl, C. E. Burton. New York: Heath, 1941.
- GAINING HEALTH, \$76.
- BUILDING HEALTHY BODIES, \$88.
- CLEANLINESS AND HEALTH PROTECTION, \$76.
- WORKING FOR COMMUNITY HEALTH, \$84.
- DENTAL HEALTH EDUCATION AND DENTAL HEALTH SERVICE IN HAWAII: A SURVEY. By Guy S. Millberry, D.D.S. Honolulu, Hawaii: The Strong Foundation, 1940. 185 pp.
- THE AMERICAN COLLEGE OF PHYSICIANS—ITS FIRST QUARTER CENTURY: A HISTORY. By William Gerry Morgan, M.D., LL.D., Sc.D. Philadelphia: American College of Physicians, 1940. 276 pp. Price, \$2.00.
- PERCHLORAN. Philadelphia: Pennsylvania Salt Manufacturing Co. (1000 Widener Bldg.), 1941. 32 pp.
- STUDIES ON TUBERCULOSIS. The American Journal of Hygiene Monographic Series, No. 16, February, 1941. Baltimore: Johns Hopkins Press. 198 pp.
- THE AVITAMINOSSES. By Walter H. Eddy and Gilbert Daldorf. 2d ed. Baltimore: Williams & Wilkins, 1941. 519 pp. Price, \$4.50.
- THE ROMANCE OF MEDICINE IN CANADA. By J. J. Heagerty. Toronto: Ryerson Press, 1940. 113 pp. Price, \$1.25.
- DISEASES TRANSMITTED FROM ANIMALS TO MAN. By Thomas G. Hull. Springfield: Thomas, 1941. 403 pp. Price, \$5.50.
- MEDICINE AND HUMAN WELFARE. By Henry E. Sigerist. New Haven: Yale University Press, 1941. 148 pp. Price, \$2.50.
- DELINQUENCY CONTROL. By Lowell Julliard Carr. New York: Harper, 1941. 447 pp. Price, \$3.50.
- YOUR COMMUNITY. ITS PROVISION FOR HEALTH, EDUCATION, SAFETY AND WELFARE. By Joanna C. Colcord. rev. ed. New York: Russell Sage, 1941. 261 pp. Price, \$85.
- MAGIC IN A BOTTLE. By Milton Silverman. New York: Macmillan, 1941. 332 pp. Price, \$2.50.
- NATURAL RESISTANCE AND CLINICAL MEDICINE. By David Perla and Jessie Marmorston. Boston: Little, Brown, 1941. 1344 pp. Price \$10.00.
- HEALTH IN ICELAND. By Vilmundur Jonsson. A Reprint from the Report on Public Health in Iceland, 1938. Reykjavik, Iceland, 1940. 29 pp.
- WOLF CHILD AND HUMAN CHILD. A Narrative Interpretation of the Life History of Kamala, the Wolf Girl. By Arnold Gesell. New York: Harper, 1941. 107 pp. Price, \$2.00.
- AMERICAN MUSEUM OF HEALTH. Report for 1939 and 1940. New York: Flushing Meadow Park, 1941. 40 pp.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

**Children's Teeth** — Structurally soundest are those teeth formed *in utero* before dietary deficiencies are normally felt by the child. This suggestive finding is from a study of London children which showed that improved nutrition as measured by the height-weight index is associated with better dental health.

ALLEN, I. A Survey of Nutrition and Dental Caries in 120 Elementary School Children. *Brit. M. J.* 4175 (Jan. 11), 1941.

**Mental Health and Welfare**—In 8 states, the state hospitals provide community psychiatric services. The example of what is done by the Worcester (Mass.) hospital should prove of interest to health administrators who have not yet worked out a satisfactory solution to the ever present problem of adult mental health. Incidentally health workers will find in the bulletin of the A. P. W. A., in which this paper appears, many useful discussions of the social aspects of public hygiene.

BARTON, W. E. The State Hospital: Consultant in Community Mental Health. *Pub. Welfare News* 9, 2:2 (Feb.), 1941.

**Brothers Under the Skin**—We are reminded frequently of the great similarity between the Australians and ourselves—devil-may-care fighters and all that! Now it seems that we may both enjoy the same variety of "Q" fever.

BENGTSON, I. A. Immunologic Relationships Between the Rickettsiae of Australian and American "Q" Fever. *Pub. Health Rep.* 56, 7:272 (Feb. 14), 1941.

**Measuring Human Comfort**—Conditions of the air which determine the

sensation of bodily comfort are, as most of us know, temperature, moisture content, movement, and radiation transfer between the body and other surfaces. Some of the recent research in body reactions to varying atmospheric conditions is summarized in this article.

FERDERBER, M. B., and HOUGHTEN, F. C. Effective Temperature Scale. *J. A. M. A.* 116, 6:474 (Feb. 8), 1941.

**Scarlet Fever Prophylaxis**—We believe that the intradermal method of immunization (with scarlatinal toxoid) is superior to the subcutaneous route, these writers conclude. They have found a decrease in severity of reactions which they attribute to the smaller doses needed and the slower absorption.

FISCHER, S., and VAN GELDER, D. W. Intradermal Immunization. *Am. J. Dis. Child.* 61, 1:88 (Jan.), 1941.

**Vaccination Prevents Smallpox**—Who was it in "Alice" who made it a practice to believe two difficult things each day? Well here are two facts for you to exercise your believing powers upon. Six states have no statutes referring in any manner to vaccination. Vaccination is a prerequisite to school attendance in only 12. From this point on the believing becomes easier.

FOWLER, W. Principal Provisions of Smallpox Vaccination Laws and Regulations in the United States. *Pub. Health Rep.* 56, 5:167 (Jan. 31), 1941.

**Men, Horses, and Encephalitis**—When the much-written-up Massachusetts outbreak of equine encephalitis was under way another outbreak was decimating the horse population of

Saskatchewan. Here, however, the human cases were fewer and the mortality rate was much less than in Massachusetts. It appears that the eastern and western types of virus are not serologically related.

GAREAU, U. Clinical Aspects of an Epidemic of Human Encephalomyelitis in Saskatchewan in 1938, (and) FULTON, J. S. Relation of Equine Encephalomyelitis to the Epidemic of Human Encephalitis in Saskatchewan in 1938. *Canad. Pub. Health J.* 32, 1:1 (Jan.), 1941.

**Influenza Research**—Although it is unlikely that you will make an immediate use of this information, you may still be interested to learn that mice—and perhaps men—may be protected, for about 10 days, against influenza virus by intranasal administration of immune serum. Larger doses given intravenously protect for about twice as long a time.

HENLE, W., *et al.* Passive Immunization of Mice against Human Influenza Virus by the Intranasal Route. *J. Immunol.* 40, 2:201 (Feb.), 1941.

**Rats, Mice, and Recent History**—In another of the excellent "medical progress" series, the recent work in the study of rat-bite fever, rickettsial infections, Weil's disease, tularemia, and brucellosis—is reviewed. A great deal of information is packed into 5 pages, and an excellent bibliography is appended.

KEEFER, C. S. Uncommon Infectious Diseases in New England. *New Eng. J. Med.* 224, 6:242 (Feb. 6), 1941.

**It Can Happen Here**—Coventry's health officer takes stock after the Luftwaffe had finished its hideous business. Typhoid immunization, shelter sanitation, hospitalization problems, and mental hazards provide an emergent problem, but do not obscure the health officers' interest in the later sanitary aspects of reconstruction.

MASSEY, A. Some Public Health Considerations Consequent Upon a Large-Scale Air Raid. *Brit. M. J.* 4176 (Jan. 18), 1941.

**Spread of Polio Virus**—Among the theoretical channels by which poliomyelitis can be transmitted are food, milk, and water. Polluted watercourses may be related to these channels, for the virus has repeatedly been isolated from "running" sewage. A distinguished commentator suggests that the authors be credited as originators of the isolation technic employed.

PAUL, J. R., and TRASK, J. D. The Virus of Poliomyelitis in Stools and Sewage. *J. A. M. A.* 116, 6:493 (Feb. 8), 1941.

**"Peace Hath Her Victories"**—How the work of the official and voluntary nursing programs were combined in Westchester County, N. Y., is a story with which everyone should be familiar. That there are a surprising number of monkey wrenches everywhere ready to be heaved into such a machine will not be news to most of us.

PRINDIVILLE, M. A Joint Voluntary and Official Program. *Pub. Health Nurs.* 33, 2:96 (Feb.), 1941.

**A New Disease to "Ketch You if You Don't Watch Out"!**—Another disease simulating the typhus-spotted fever group is described. Its name is toxoplasmosis, and it has been recognized since 1900 as an animal disease. Tick transmission is suggested, but other more direct means of transfer may exist.

PINKERTON, H., and HENDERSON, R. G. Adult Toxoplasmosis, (and) SABIN, A. B. Toxoplasmic Encephalitis in Children. *J. A. M. A.* 116, 9:807 (Mar. 1), 1941.

**Inherited Human Anomalies**—Are you a P. T. C. Taster? Two chemists tested a large number of individuals and discovered that 70 per cent found phenyl thiocarbamide to be very bitter, whereas to 30 per cent it had no taste whatever. Inability to taste the chemical is inherited as an autosomal recessive. Perhaps you had better read the paper if you are curious to know what that is.

STRANDSKOV, H. H. The Distribution of Human Genes. *Scient. Monthly* 52, 3:203 (Mar.), 1941.

**Housing and Health—Milwaukee** is attempting to control the housing situation in congested areas so that safe and decent places to live, measuring up to known and enforcible standards, may be provided for people with low incomes. Close coöperation exists between the health and building inspection departments and this has helped.

SENN, C. L. Procedure for the Maintenance of Housing Standards in Milwaukee. *Pub. Health Rep.* 56, 5:189 (Jan. 31), 1941.

**The Viruses** — Those who want orientation in this expanding area of

biology will find this essay lucid and interesting.

STANLEY, W. M. Some Chemical, Medical and Philosophical Aspects of Viruses. *Science*, 93:2407 (Feb. 14), 1941.

**For Rheumatic Fever Susceptibles** —Promising indeed is this latest report upon the prophylactic value of small doses of sulfanilamide in preventing returns of rheumatic fever in susceptible children. It is devoutly to be hoped that more will be learned about this apparent aid in the difficult public health problem presented by rheumatic fever.

THOMAS, C. B., *et al.* The Prophylactic Use of Sulfanilamide. *J. A. M. A.* 116, 7:551 (Feb. 15), 1941.

## ASSOCIATION NEWS

SEVENTIETH ANNUAL MEETING  
ATLANTIC CITY, N. J., OCTOBER 14-17, 1941

HEADQUARTERS  
Convention Hall

### APPLICANTS FOR MEMBERSHIP

*The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.*

#### *Health Officers Section*

Eusebio, D. Aguilar, M.D., Director of Health, Manila, Philippine Islands  
Carroll T. Bowen, M.D., 501 South Andrews Ave., Fort Lauderdale, Fla., Director, Broward County Health Dept.  
Louis A. Breffeilh, M.D., Avoyelles, Parish Health Unit, Marksville, La., Medical Director  
Irving J. Crain, M.D., 1542 E. 9th St., Brooklyn, N. Y., Health Officer in Training, Dept. of Health, City of New York  
James E. Davey, M.B., 20 Main St., W., Hamilton, Ont., Can., Medical Officer of Health  
Harry-Rolf Germer, M.D., M.P.H., Dept. of Public Health & Preventive Medicine, Univ. of Texas, Galveston, Tex., Assistant Director of Public Health and Preventive Medicine  
Charles W. Harwell, M.D., Crisp County Dept. of Health, Cordele, Ga., Commissioner of Health  
William K. McDowell, M.D., C.P.H., 1009 Panola, Tarboro, N. C., Director, Edgecombe-Greene Health District  
Nicholas D. McGlaughlin, M.D., 3400 Biddle Ave., Wyandotte, Mich., Commissioner of Health  
Anton C. Sibilsky, M.D., Health Unit, Lewiston, Ida., Acting Director, North Central District Health Unit  
John D. Winebrenner, M.D., 912 Forest St., Ann Arbor, Mich., Student trainee, Univ. of Michigan  
Jacob Zinbarg, D.D.S., 6350 Wetherold St., Rego Park, N. Y., Chief, Dental Division, National Youth Administration

#### *Laboratory Section*

Rosario Berard, M.D., City Hall, Municipal Laboratory, Montreal, Que., Can., Superintendent-Bacteriologist  
Alexander G. Campbell, B.S., Dept. of Pensions & National Health, John & Sussex Sts., Ottawa, Ont., Can., Junior Bacteriologist, Laboratory of Hygiene  
Olan W. Dillon, Jr., 126 Groveland Place, San Antonio, Tex., Junior Bacteriologist, Health Dept.  
Sanford S. Elberg, Ph.D., 619-43rd Ave., San Francisco, Calif., Instructor in Bacteriology, San Francisco Junior College  
Moses L. Isaacs, Ph.D., 600 West 168th St., New York, N. Y., Assistant Professor of Sanitary Science, DeLamar Institute of Public Health, Columbia Univ.  
Florence Makower, 2419 Durant Ave., Berkeley, Calif., Student in Public Health, Univ. of California  
Robert E. Power, Fillmore Farms Inc., Bennington, Vt., Laboratory Technician  
Grace M. Sickles, B.A., 2201 Twelfth St., Troy, N. Y., Associate Bacteriologist, Division of Laboratories and Research, State Dept. of Health  
John F. Von der Lieth, Ph.B., Sc.M., 768 Bergen Ave., Jersey City, N. J., Director, Hudson County Board of Health Laboratories  
Alan E. Wicks, B.A., Box 1931, Juneau, Alaska, Laboratory Technician, Territorial Dept. of Health

#### *Vital Statistics Section*

Arthur Lenz, B.S., 3101 Avenue I, Brooklyn,



- N. Y., Statistical Clerk, New York City Dept. of Health  
 T. G. Mongan, 325 E. Broadway, East St. Louis, Ill., Chief Clerk and Statistician, East Side Health Dist.

#### *Engineering Section*

- Bergen F. Berkaw, B.S. of C.E., 327 S. Main St., Lexington, Va., County Health Engineer, Rockbridge Health Dept.  
 Reginald Bowering, M.S., Provincial Board of Health, Parliament Bldgs., Victoria, B. C., Can., Public Health Engineer and Chief Sanitary Inspector  
 Joseph E. Flanagan, Jr., B.S., 418 Oakland Ave., Greensburg, Pa., Assistant Sanitary Engineer, U. S. Public Health Service  
 Chris A. Hansen, B.S. in C.E., 222 S. 11th St., Griffin, Ga., Public Health Engineer, State Health Dept.  
 Eric W. Mood, B.S., Ives St., Mt. Carmel, Conn., Sanitary Engineer, New Haven Water Co.  
 Earle W. Sudderth, B.S., City Hall, Houston, Tex., Industrial Hygiene Engineer, Division of Industrial Hygiene, State Dept. of Health

#### *Industrial Hygiene Section*

- Frank E. Adley, B.S., Barre City Hospital, Ind. Hyg. Off., Barre, Vt., Industrial Hygiene Engineer, State Health Dept.  
 Robert B. Aiken, M.D., 7 Orange St., Barre, Vt., Medical Director of Industrial Hygiene, State Dept. of Health  
 William H. Kreckler, Jr., Ch.E., 5331 N. Carlisle St., Philadelphia, Pa., Chemical Engineer, Bureau of Industrial Hygiene, State Dept. of Health

#### *Food and Nutrition Section*

- Cyril C. Sullivan, B.S., 408 Atlantic Ave., Boston, Mass., Chief Inspector, Boston Station, Food and Drug Administration

#### *Maternal and Child Health Section*

- Glenn D. Hutchinson, M.D., Pioche, Nev., County Physician  
 Ralph E. Weddington, M.D., Barnett Bldg., Batesville, Ark., Medical Director, Independence County Health Unit  
 Carl E. Weigele, M.D., M.P.H., 455 West State St., Trenton, N. J., Medical Assistant, State Dept. of Health

#### *Public Health Education Section*

- Thomas W. Clune, D.M.D., 1282 Cranston St., Cranston, R. I., Public Health Dentist, State Dept. of Health  
 Jennie Cole-Asarian, B.A., 280 Loretto St., Tottenville, S. I., N. Y., Substitute Teacher of Hygiene and Home Nursing, New York City Board of Education

- Electa G. Gartin, B.S., R.N., Health Unit, Lewiston, Ida., Supervising Nurse, North Central District Health Unit  
 W. Russell Greenwood, M.D., Rutgers Univ. Infirmary, New Brunswick, N. J., Director of Student Health  
 Pasquale J. Pesare, B.S., C.P.H., 139 Devonshire, Providence, R. I., Genito-Infectious Disease Laboratory Consultant, State Dept. of Health  
 William Roemmich, M.S., 701-11th St., Bismarck, N. D., Director of Health Education, State Dept. of Public Health  
 Wellington P. Shahan, A.B., 907 First National Bank Bldg., Springfield, Ill., Executive Secretary, Illinois Tuberculosis Assn.

#### *Public Health Nursing Section*

- Jane P. Brown, R.N., B.S., State Dept. of Health, 1412 Smith Tower, Seattle, Wash., Consultant Public Health Nurse in Orthopedic Nursing  
 Mildred D. Byers, B.S., Board of Health, Honolulu, T. H., Associate Director, Bureau of Public Health Nursing  
 G. Aileen Dyer, B.S., 1206 S. W. Gibbs St., Portland, Ore., Field Advisory Nurse, Div. of Public Health Nursing, State Board of Health  
 Mary C. Fulton, R.N., B.Ph., 1806 Maple Ave., Evanston, Ill., Director of Nurses, Evanston Infant Welfare Society  
 Mary Ellen Redmond, R.N., 404 King St., Bay City, Mich., Director, Public Health Nursing Service  
 Hazel M. Reed, A.B., R.N., Visiting Nurse Assn. of Albany, Inc., 245 Lark St., Albany, N. Y., Director  
 Rose S. Reith, R.N., 300 Franklin Ave., Astoria, Ore., Clatsop County Probation Officer  
 Nellie A. Simmons, R.N., General Hospital, Paterson, N. J., Educational Director, School of Nursing

#### *Epidemiology Section*

- Paul M. Brick, Health Dept., Coral Gables, Fla., Director, Dept. of Inspection  
 Alvin A. Florin, M.D., 217 Lark St., Albany, N. Y., Epidemiologist-in-Training, State Dept. of Health  
 Eleanor M. Roche, 28 Kittredge Terrace, San Francisco, Calif., Student, Univ. of California  
 Sylvio Torres, D.M.V., Rua Ibituruna 12 casa 7, Rio de Janeiro, Brazil, S. A., Chief Assistant, Division of Animal Pathology, Dept. of Agriculture

#### *Unaffiliated*

- Randolph G. Bishop, Shoreham Bldg., Washington, D. C., Executive Secretary, National Dental Hygiene Assn.

Cloyd M. Chapman, Powers X-ray Products, Inc., Glen Cove, N. Y., Engineer, Public Health Division

Conrad G. Selvig, M.A., 1303 Georgina Ave., Santa Monica, Calif., Member, Board of Directors, American Society for the Hard of Hearing

Anatole A. Solow, 285 Edgewood Ave., New Haven, Conn., Research Assistant, Committee on Hygiene of Housing, American Public Health Assn.

Louis F. Westbrook, B.S., 4746 N. W. 10th Ave., Miami, Fla., Sanitary Officer, Dade County Health Dept.

## EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

The American Public Health Association has been requested to prepare a reservoir of the names of persons eligible for appointment as physicians with experience or special interest in public health work, as industrial hygienists, as engineers, and as laboratory technicians. Persons with training and experience in these fields are invited to register with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

### POSITIONS AVAILABLE

Bacteriologist — Alexandria, Virginia, City Department of Health. Milk, water serological and general examinations. Salary \$1,200 to \$1,800 according to training and experience. Apply to W. A. Browne, M.D., Health Officer.

Physician with public health training to serve as full-time county health officer in rural South Atlantic area. Salary \$3,600 to \$4,000. Write Box C, Employment Service, A.P.H.A.

The Arlington County Health Department in Arlington, Va., announces a vacancy for a male bacteriological technician, salary \$1,900 per annum, which may be increased for satisfactory service. Applicants should apply to R. G. Beachley, M.D., Director of Health and Welfare.

Public Health Nurse—General nurse for Alexandria, Va., City Health Department. Must be a graduate of an accredited hospital with special training and experience in public health. Salary \$1,620 to \$1,800 according to qualifications. Apply to W. A. Browne, M.D., Health Officer.

County Public Health Nurses for New Mexico. Must have 4 months postgraduate instruction under one of the recognized public health nursing courses and 1 year's experience. Must drive and have a car. Address inquiry to State Health Department, Santa Fe, New Mexico.

### U. S. CIVIL SERVICE COMMISSION

The Commission has announced that applications will be received for positions as Senior Medical Officer (\$4,600), Medical Officer (\$3,800), and Associate Medical Officer (\$3,200), for appointments in the Public Health Service, with the Food and Drug Administration, Veteran's Administration, and the Indian Service. Forms for application may be obtained from the U. S. Civil Service Commission, Washington.

The Commission also announces that applications may be filed for the positions of Public Health Nurse (\$2,000) and Graduate Nurse, general staff duty (\$1,800) in the Indian Field Service, including Alaska. Forms may be obtained from the U. S. Civil Service Commission, Washington.

### POSITIONS WANTED

#### ADMINISTRATIVE

A woman physician with rather unusual qualifications in maternal and child health, state and local experience, now completing courses for M.P.H. Especially interested in local health administration. A376

Physician, aged 39, excellent graduate training and experience in public health, specialized in tuberculosis and epidemiology, now employed, will consider position with salary of \$4,500 or better. A473

Experienced physician, graduate University of Illinois, M.P.H. Johns Hopkins 1940, seeks administrative opening suitable to his proven ability. Excellent references. A466

Physician, M.P.H. Harvard, well experienced in city and rural health administration, will consider appointment as district health officer in city or state health department. A418

Physician, aged 38, M.P.H. Harvard 1932, experienced as director of county units and in state department of health. Will consider administrative position. A474.

Physician, graduate of University of Iowa, candidate for Dr.P.H. at Harvard, seeks good administrative position. A476

Physician, M.D. Yale; M.S.P.H. Columbia; also short course for health officers, Vanderbilt. Good clinical background, 3 years' public health experience. Will consider appointment in child health, epidemiology or public health administration. A350

Experienced physician with A.B. and M.D. from University of Pennsylvania, and M.P.H. from Yale, desires full-time position as health officer. Will consider going abroad with relief expedition to Europe or Asia. A477

Physician, specialist in maternal and child health. M.D. University of Kansas, M.P.H. Harvard. Excellent background in pediatric residences, experience in municipal and county health work and as director of maternal and child health in state health departments. Desires position as director of a state program, as pediatrician, or in school or college health program. A479

Dentist, University of Pittsburgh. D.D.S., M.P.H. University of Pennsylvania 1941, experienced in practice, wishes an administrative position in public health, preferably at state level. M450

#### HEALTH EDUCATION

Well qualified woman physician, M.A. and M.D. from Stanford, with 6 years'

experience in nationally known secondary school in health education and medical advisory duties, wishes position in college health work. H448

Health educator with excellent background of teaching experience in schools. M.S.P.H. University of Michigan. Wishes position where skill with educational sound film projection and other recognized technics will be appreciated. H405

Public health nurse, M.A. Columbia, experienced in teaching health education and public health nursing. Wishes teaching position in college or university summer of 1941. H472

#### LABORATORY

Experienced woman bacteriologist, Ph.D. University of Illinois 1937, wishes position in teaching or research. Excellent bibliography and references. L410

Experienced bacteriologist, young man of 33, Sc.B., who for several years has been in charge of state laboratory doing public health and diagnostic bacteriology, immunology, and serology, will consider opening. L427

#### SANITARY ENGINEERING

Engineer, aged 38, 3 years' experience as district sanitary supervisor, state department of health, together with work on plumbing, heating, and ventilation, will consider position in the plumbing or heating field or state department of health. Prefers middle western or western states. E453

Public Health Engineer, B.S. in Sanitary Engineering from Massachusetts Institute of Technology, experienced in Massachusetts, Connecticut, and Kentucky, seeks position as sanitary or public health engineer with health department. E380

Engineer with good training and experience in water treatment, sewage plant operation and in research, wishes position as superintendent. Can go anywhere. E422

## Advertisement

## Opportunities Available

**PUBLIC HEALTH PHYSICIANS**—(a) County health physician; duties will include supervision maternal and child health program, communicable disease control; about \$4,200; East. (b) Young physician qualified to take charge of health center to be established soon; Florida. (c) Physician with public health training, qualified also in obstetrics or pediatrics; interesting appointment, state health department; \$3,300, travel allowance; opportunity advancement. (d) District health physician; \$4,200, plus \$600 travel allowance; M.S. in public health, experience in rural health work required. (e) Venereal disease clinician; special training not required; county health department. (f) City physician; \$250, private practice privileges; city of 25,000; South. (g) Physician to take charge state program of industrial hygiene; \$300, plus travel allowance. PH4-1, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**STUDENT HEALTH PHYSICIAN**—Four year appointment with university health service; opportunity to combine duties with training leading to M.S. in public health or other specialty. PH4-2, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**GRADUATE NURSE**—For interesting appointment, health education department of state institution; Degree required; duties include clinic work, care of sick children in infirmary, teaching of health classes; September through June; excellent living conditions; East. PH4-3, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSES**—(a) Several for county health nursing positions; \$135-\$150; West. (b) Several for staff positions with state board of health; year's training public health, additional ex-

perience required; \$1,800, plus \$600 travel allowance; Southwest. (c) Certified public health nurse; city health department; 18 nurses on staff; department covers all school nursing in city, also conducts maternity center; Midwest. PH4-4, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**SCHOOL NURSE**—Certified public health nurse qualified to teach public health nursing; city school system including township high school, two grammar schools; \$1,700; pleasant little town about two hours' drive from Chicago. PH4-5, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**EDUCATIONAL DIRECTOR**—Certified public health nurse with degree and considerable public health experience in an executive capacity for appointment as educational director; state department of public health nursing; about \$175. PH4-7, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**OUTPATIENT DEPARTMENT SUPERVISOR**—Recently reorganized department, located on ground floor, fairly large eastern hospital; public health nurse with sound educational background required; adequate staff of assistants. PH4-6, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**JUNIOR BACTERIOLOGIST**—Municipal health department; bacteriology or chemistry major with minimum two years' laboratory experience required; experience must have been gained in state or municipal health laboratory; \$150; midwestern metropolis. PH4-8, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

## Advertisement

## Situations Wanted

**PUBLIC HEALTH NURSE**—Graduate of eastern training school; B.S. degree in Public Health Nursing, Columbia; 10 years, director of nurses, public health nursing association; 5 years, field supervisor, large industrial company; 3 years, educational director and supervisor, Visiting Nurse Association; immediately; previous executive appointment in public health nursing. PH4-9, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**BACTERIOLOGIST**—A.B., Ph.D., state uni-

versity; 6 years, university laboratory of animal pathology; 4 years, parasitologist, state department public health. PH4-10, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH PHYSICIAN**—B.S. and M.D. degrees state university; M.P.H. Johns Hopkins; 4 years, director of county health unit; recommended as highly skilled man in the field of public health theory and administration. PH4-11, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

## NEWS FROM THE FIELD

### DIAMOND JUBILEE, NEW YORK CITY BOARD OF HEALTH

THE 75th Anniversary of the founding of the New York City Board of Health was observed in the Health Department auditorium, 125 Worth Street, on March 5 with a program at which Dr. John L. Rice presided, the speakers including Dr. Haven Emerson, Dr. James Alexander Miller, and Mayor Fiorello H. LaGuardia.

Dr. Rice pointed out in introducing Dr. Emerson that Dr. Emerson's father was one of the very first appointees as Medical Inspector on the founding of the New York City Board of Health, and he presented Dr. Emerson with a photostatic copy of the oath of office taken by his father on that occasion. Dr. Emerson presented an address and offered to Dr. Rice the first bound copy of the complete consolidated statistics of the New York City Board of Health covering the first seventy-five years.

Mayor LaGuardia announced a plan to establish a Medical Research Bureau as part of the New York City Department of Health with the hope that it could be under way during the current year. The institute would be devoted to major problems of public health and would draw promising young scientists from wherever they could be found. He said that the Board of Health was studying ways of financing such a venture and was considering the imposition of a fee of one dollar for each marital blood test.

Dr. Rice recalled that a former mayor of New York City, when asked to call together the Board of Health for an urgent matter of epidemic control, expressed the candid opinion that the Board of Health was more of a menace to New York City than the epidemic. Following this episode, the State of New York authorized the establishment of a Metropolitan Board of Health which

included not only the portion then included in New York City but Brooklyn, Queens, and Westchester Counties as well.

### NEW HOUSING UNIT IN CONNECTICUT STATE HEALTH DEPARTMENT

THE Connecticut State Department of Health has given recognition to housing as a field of public health activity by creating a full-time housing division in The Bureau of Sanitary Engineering. Under the State Merit System procedure a newly created position of Housing Engineer was filled on January 1, 1941, by the appointment of Eugene L. Lehr, previously a sanitary engineer on the department staff, who will work under the direction of Warren J. Scott, Bureau Director.

Advisory service to local health officials on problems of housing inspection and enforcement will be a major activity of the new unit. Coöperation with local health and housing officials in the conduct of special housing surveys in congested urban districts is now being planned.

As a part of the early program, a critical review will be undertaken of the present state tenement house and lodging house laws, looking toward possible revision of these laws in line with modern practice elsewhere.

Problems of water supply and sewage disposal in areas not served by public facilities will be a further concern of the housing division. At the present time local health officers are being urged to sponsor ordinances under which sewage disposal facilities will be approved prior to construction of dwellings.

Consulting service in connection with this program is being furnished by the Committee on the Hygiene of Housing of the American Public Health Association.

# REVISION OF THE TREASURY DRINKING WATER STANDARDS

THE requirements for drinking and culinary water provided by common carriers for the use of passengers carried in interstate traffic, commonly known as the "Treasury Department Drinking Water Standards," were last revised in 1925, and published in *Public Health Reports* of April 10 of that year. Since that time many improvements in water supply practice have been adopted with resulting increased uniformity of quality and safety to the consumer. The revision of the standards to conform more closely to current requirements for water supplies of attainable safety and potability is accordingly in order.

To carry out such a revision, the Surgeon General of the U. S. Public Health Service has appointed a special advisory committee composed of representatives of various federal organizations and scientific associations and several members at large. A smaller subcommittee of U. S. Public Health Service officers has been designated to prepare tentative suggestions for changes in the present standards which will be submitted for the consideration of the advisory committee.

The membership of the advisory committee, together with the name of the organization which each represents, is as follows:

## U. S. Public Health Service

### Chairman:

Joseph W. Mountin, M. D.  
Assistant Surgeon General  
Domestic Quarantine Division

### Secretary:

J. K. Hoskins, B.S., C.E.  
Chief, Sanitation Section  
Domestic Quarantine Division

## American Chemical Society

A. M. Buswell, Ph.D.

## American Public Health Association

Abel Wolman, Dr.Eng.

## American Society of Civil Engineers

Arthur E. Gorman

## American Water Works Association

Charles R. Cox

## Society of American Bacteriologists

A. C. Hunter, Ph.D.

## Conference of State Sanitary Engineers

Arthur D. Weston

## Food and Drug Administration

J. W. Sale

## U. S. Geological Survey

W. D. Collins

## Association of American Railroads

R. C. Bardwell

## Members-at-large

R. F. Goudey, M.S.

R. E. Buchanan

Herman G. Baity, Sc.D.

The subcommittee, officers of the U. S. Public Health Service, consists of the following members:

H. W. Streeter

C. C. Ruchhoft

C. T. Butterfield, M.S.

Lawrence T. Fairhall

R. E. Tarbett, C.E.

## HARVARD SUMMER COURSES IN INDUSTRIAL HYGIENE

OWING to the demand of the government services and of the defense industries for physicians and engineers trained in industrial hygiene, the Harvard School of Public Health is planning to offer both its lecture and laboratory courses in this field, ordinarily given in the academic year, in a special summer course running from May 1 through July. Details may be secured from the Secretary of the School, 55 Shattuck Street, Boston, Mass.

## WATERBURY, CONN., HEALTH COUNCIL

A HEALTH Council comprising representatives of medical, dental, civic, and other agencies has been formed in Waterbury, Conn. The purpose of the Council, which is an outgrowth of the Waterbury Citizens' Advisory Committee on Health, will be, among other things, to develop a co-operative program with all community public health agencies.

### MASSACHUSETTS STREAM POLLUTION

A MASSACHUSETTS committee consisting of the following members has been appointed by Governor Saltonstall, to work with similar committees of the New England states for the classification of state waters from the standpoint of pollution:

Arthur D. Weston, Chief Engineer of the  
Department of Public Health, Chairman  
Raymond J. Kenney, Commissioner of the  
Department of Conservation  
Richard K. Hale, Director, Division of Water-  
ways, Department of Public Works  
Otis D. Fellows, Chief Engineer, State Plan-  
ning Board

This is the result of certain activities of the National Resources Planning Board, Water Resources Agencies in New England.

Bills filed with the Massachusetts Legislature would authorize the State Department of Public Health to adopt rules and regulations relative to stream pollution and order the installation of municipal sewage treatment works.

### NATIONAL DEFENSE

Massachusetts has set up a state emergency plan for use in any emergency including national defense which coördinates the facilities of all state departments under the direction of the Adjutant General. The Health Program under this plan further coördinates the work of the health officers and sanitary engineers in the field and laboratories with the central office.

The Massachusetts Department of Public Health is sponsor for three large WPA projects which provide for environmental sanitation studies in the vicinity of military areas and construction of remedial sanitary works.

The Director of the Division of Sanitary Engineering of the Massachusetts Department of Public Health has been named chairman of the subcommittee

of the Northeastern Section of the American Society of Civil Engineers covering matters of sanitary and public health engineering. The work of this committee is coördinated with the work of the main committee of the American Society of Civil Engineers.

In connection with the meeting of the New England Health Institute, to be held at the Hotel Statler, Boston, April 2-4, there is to be a meeting of the section of Environmental Sanitation on April 3 jointly with the New England Water Works Association and the New England Sewage Works Association, at which various well known speakers are to present papers on national defense and sanitation. This meeting is to be followed on April 4 by a trip to Fort Devens for an examination of the sanitary works.

### DR. FROST'S PAPERS BEING PUBLISHED

THE Commonwealth Fund, of New York, N. Y., has announced that a volume of papers by Wade Hampton Frost, M.D., is now in preparation. The papers have been selected by friends of Dr. Frost and edited by Kenneth F. Maxcy, M.D., successor to Dr. Frost as Professor of Epidemiology at the Johns Hopkins School of Hygiene and Public Health, Baltimore.

The Fund hopes to publish the volume in the spring of 1941.

### "THE STATE OF YOUR NATION"

A REPORT on the State of Your Nation," reprinted from the February and March issues of *McCall's Magazine*, is made available to readers of the *Journal* without charge on request to the Association office. It contains material of interest to health workers.

*McCall's* for April continues its national defense reporting. Professor C.-E. A. Winslow contributes an article on "The Strength of the Country."

AMERICAN MUSEUM OF HEALTH  
ANNOUNCES SCIENTIFIC  
ADVISORY BOARD

IT has been announced by Dr. Louis I. Dublin, Chairman of the Board of Directors of the American Museum of Health, of New York, N. Y., that the Museum has created a Scientific Advisory Board.

The board is comprised of 67 of the nation's outstanding authorities in medicine and public health under the chairmanship of Dr. Haven Emerson, and includes 32 members of the American Public Health Association as follows:

Dr. Leverett Bristol  
Dr. Anton J. Carlson  
Dr. E. H. L. Corwin  
Dorothy Deming  
Dr. Rolla Dyer  
Dr. Kendall Emerson  
Dr. Morris Fishbein  
Dr. Thomas Francis, Jr.  
Leslie Frank  
Dr. Edward S. Godfrey, Jr.  
Dr. S. S. Goldwater  
Dr. Leonard Greenburg  
Dr. John Hardenbergh  
Dr. H. E. Kleinschmidt  
Dr. A. J. Lanza  
Dr. Alfred J. Lotka  
Arthur P. Miller  
Dr. John Mohler  
Dr. Ralph Muckenfuss  
Dr. C. W. Munger  
Dr. J. Oppie McCall  
Dr. Thomas Rivers  
Dr. Milton Rosenau  
Dr. George Ruhland  
Dr. Henry C. Sherman  
Dr. W. G. Smillie  
Dr. W. F. Snow  
Dr. Philip Van Ingen  
Dr. Augustus B. Wadsworth  
Dr. W. Frank Walker  
Dr. C.-E. A. Winslow  
Dr. Abel Wolman

OREGON STATE BOARD OF HEALTH  
REPORTS

IN November, 1940, an investigation of pollution of the Columbia River jointly by the states of Oregon and

Washington was undertaken under the direction of the Oregon State Sanitary Authority and the Washington State Pollution Commission. The work at present is being conducted by a field staff consisting of a chemist, a bacteriologist, and a fisheries biologist, who operate under the direction of an Interstate Technical Advisory Committee. This committee consists of Carl E. Green as Chairman, C. M. Everts, Jr., Principal Assistant Sanitary Engineer, as Secretary, and four others as follows:

Dr. William Levin, Director, Hygienic Laboratory, Oregon State Board of Health  
Lloyd A. Royal, Biologist, Washington State Department of Fisheries  
C. F. Pautzke, Biologist, Washington State Department of Game  
P. E. Seuffer, Assistant Public Health Engineer, Washington State Board of Health

The investigation which is now under way will be conducted for a period of about 1 year or 16 months. The request for such a survey originated from fishermen and fish packing companies on the Columbia River, because of the presence of a slime growth which has been increasing in recent years and which, it is claimed, fouls fishermen's nets and kills salmon. The survey will include an investigation of the D.O., B.O.D., coliform organisms, etc., in addition to this particular slime problem.

The study is also being made to determine the quantity and strength of industrial wastes and municipal sewage being discharged into the river and its principal tributaries. This study is limited to the lower section of the Columbia River from the Bonneville Dam to its mouth. With the rapid expansion of industrial development in this area to make use of power from the Bonneville and Grand Coulee projects, information gathered in such a survey will serve as a valuable source of data in determining the extent of treatment which shall be required of wastes discharged into the Columbia River and its tributaries.



#### COURSE ON RECENT ADVANCES IN TROPICAL MEDICINE

THE New York Post-Graduate Medical School has announced a course on recent advances in tropical medicine, to be given in New York May 19-23, under the direction of Dr. Z. Bercovitz. The purpose of the course is to bring to physicians a review of the fundamentals of the various subjects in tropical medicine and the more recent advances that have come from research. Authorities in their respective fields will give lectures and demonstrations and opportunities for practical work in clinical parasitology are offered.

Among the subjects to be included are: malaria, yellow fever, intestinal parasites, filariasis, amebic dysentery, bacillary dysentery, tropical skin diseases, kala azar, leptospirosis, relapsing fever, rat bite fever, trichinosis, echinococcus, deficiency diseases, lymphogranuloma venereum, sanitary engineering and tropical hygiene.

#### PAN-AMERICAN LEAGUE AGAINST CANCER ESTABLISHED

THE incorporation of the Pan-American League Against Cancer is announced to carry on in the Western Hemisphere the scientific and social work of the International Union Against Cancer. The latter previously maintained headquarters in Paris, engaging in the fight against cancer on an international scale. Fifty-two countries were affiliated with the International Union.

Professor Francis Carter Wood, of New York, Professor Angel H. Roffo, of Buenos Aires, and Boris Pregel, respectively vice-president, member of the Board of Directors and president of the Finance Committee of the International Union Against Cancer, are organizers of the Pan-American League, with the cooperation of many other persons in the field of cancer throughout the American continent.

The aims of the new organization are:

- (a) To promote and encourage the international fight against cancer
- (b) To coördinate in the countries of the American continent the scientific study and research in cancer and to publish and disseminate information thereon
- (c) To engage in social welfare work in its relation to the problem of cancer
- (d) To promote the establishment of national organizations throughout the Western Hemisphere to engage in similar activities.

In furtherance of these objectives, the League hopes to:

- Publish a Pan-American Cancer Journal
- Organize and maintain a Pan-American center of information and statistics on cancer
- Establish a Pan-American system of fellowships
- Organize a First Pan-American Cancer Week to be held simultaneously in all the countries of the American continent
- Organize a Pan-American Congress for the Scientific and Social Fight Against Cancer, possibly in Buenos Aires in 1942.

#### KENT COUNTY, MICHIGAN, HEALTH EXHIBIT

THE Kent County Medical Society opened a health exhibit in the Public Museum of Grand Rapids, Mich., January 9. The exhibit will continue for 6 months, the themes to be changed from time to time, covering tuberculosis, pneumonia, cancer, infantile paralysis, allergy, and diabetes.

The auxiliary to the County Medical Society is planning a display of antique medical instruments, the City Health Department one on public health work, and the Kent County Dental Society one on dentistry.

The Women's Field Army of the American Society for the Control of Cancer is coöperating in the exhibits on cancer.

Grand Rapids Junior College is lending a series of charts on anatomy to be used in connection with the exhibits.

William R. Vis, M.D., of Grand Rapids, is chairman of the committee in charge of the exhibit.

## CHILD CARE EXHIBIT

**A**N exhibit dramatizing the care of children from birth to school age, entitled "Your Child and Its Care," opened March 18 in the science department of the Newark Museum, Newark, N. J. It is the fourth in a series of displays on health and medical science arranged in coöperation with the Essex County Medical Society and will remain on view until the middle of May.

The exhibit includes hospital and nursery equipment, models, and photographs, and illustrates the latest methods evolved by science to safeguard the health of children. Most of the material was lent by hospitals and other agencies in the city.

## THE ELLEN H. RICHARDS INSTITUTE

**T**HE Trustees of Pennsylvania State College have announced the establishment of the Ellen H. Richards Institute, named in honor of the first woman to receive a degree in chemistry from the Massachusetts Institute of Technology, Ellen H. Richards, 1842-1911. Dr. Pauline Beery Mack, who has been Director of Research in Home Economics at the college since 1935, will direct the Institute.

Research studies in human nutrition, textile technology, in the physics of detergency, and studies on new materials for the construction of houses will be carried on in the Institute.

## JESSAMINE WHITNEY

**J**ESSAMINE WHITNEY, statistician on the staff of the National Tuberculosis Association, since 1918, died suddenly in New York, N. Y., on March 11.

In addition to her very substantial contributions of statistical studies and her active participation in the work of a number of American Public Health Association committees, Miss Whitney has served the Vital Statistics Section

as Secretary and as Chairman, and has been responsible for the publication of the first and second editions of the Vital Statistics Directory.

## PERSONALS

## Central States

**LIEUT. MARCUS D. BURNSTINE**, of Columbus, Ohio, Medical Reserve Officer, has been named Physician in Charge of the Health Service Station for Civilian Employees at the Rock Island Arsenal, succeeding **DR. RODERICK G. ST. PIERRE**, of Rock Island, Ill., who went to Portland, Ore.

**LLOYD K. CLARK**,† Director, Division of Engineering, North Dakota State Department of Health, Bismarck, N. D., has received notice that orders are being prepared effective March 15 for active duty with the Sanitary Corps, with headquarters at the 7th Corps Area, Omaha, Nebr., attached to the Corps Area Surgeon's office.

**FLOYD M. FELDMAN**, M.D.,† Director of Rural Health of District No. 3 of the Minnesota State Board of Health, with headquarters in Rochester, has been appointed part time Deputy of Rochester, effective January 1.

**LLOYD H. GASTON**, M.D.,† Director of the Sanilac County Health Department, Sandusky, Mich., has been named Director of Local Health Services in the Ohio Department of Health.

**DANIEL CAMERON LOCHEAD**, M.D., D.P.H.,† Deputy City Health Officer of Rochester, Minn., for 16 years, has resigned, effective April 14.

**CLYDE C. SLEMONS**, M.D.,\* Health Commissioner of Grand Rapids, Mich., from 1910 to 1930, has returned to serve in this position, succeeding **JOHN L. LAVAN**, M.D.,\* who recently resigned to become Health Commissioner of Toledo, Ohio.

\* Fellow A.P.H.A.

† Member A.P.H.A.

W. H. WISELY, Engineer-Manager of the Urbana and Champaign, Ill., Sanitary District, has added to his duties that of serving as the new Executive Secretary of the Federation of Sewage Works Associations. Mr. Wisely has long been active in the sanitary engineering field, having served for the past 4 years as Secretary-Treasurer of the Central States Sewage Works Association. His headquarters address as Executive Secretary of the Federation of Sewage Works Associations is Box 18, Urbana, Ill.

#### Eastern States

FRANK R. BLAISDELL, who was a District Sanitary Engineer in the Maine State Department of Health and Welfare, entered military service on February 7. He is with the Q. M. Replacement Center, Camp Lee, Virginia.

JOSEPH BRUCE CROOK, M.D., has been appointed Health Officer of East Haddam, Conn.

EDWARD P. DENNE, M.D., has been named Health Officer of Unionville Borough, Unionville, Conn.

DONALD H. ECKLES, M.D.,† of New Castle, Pa., has recently been appointed District Medical Officer, for Beaver, Butler, and Lawrence Counties. On February 15 he was awarded the Degree of Master of Public Health by the University of Pennsylvania.

MILTON A. FEINBERG,† who has been Field Secretary of the Kips Bay-Yorkville District Health Committee on Neighborhood Health Development in New York, N. Y., has joined the staff of the National Refugee Service as a member of the Field Service and Re-settlement Department.

KENNETH L. GILBERT, M.D., of Say-

brook, Conn., has been appointed Health Officer of Redding, succeeding ALBERT J. TRIMPET, M.D.

EDWARD A. McLAUGHLIN, M.D.,† of Providence, R. I., has been appointed Director of the Rhode Island Department of Public Health, Providence, succeeding LESTER A. ROUND, PH.D.\* Dr. McLaughlin held the position for a period ending in 1939.

LUCY S. MORGAN, PH.D.,\* who has been General Secretary of the Hartford Tuberculosis and Public Health Society, Hartford, Conn., has been appointed head of a new department of health education at Winthrop College, Rock Hill, S. C., effective September 1.

#### Southern States

JOHN ANDREWS,† formerly in charge of Milk Control Sanitation for the North Carolina State Board of Health, is now with the U. S. Public Health Service, with headquarters in Washington. Mr. Andrews was also formerly Secretary-Treasurer of the Sanitary Engineers' and Sanitation Officers' Section of the Southern Branch of the American Public Health Association.

BATHURST B. BAGBY, M.D.,† of West Point, Va., former Director of the Bureau of Child Health in the State Health Department, has been appointed City Epidemiologist and Chief Health Officer of Richmond on a temporary basis. WILLIAM ARKELL BROWNE, M.D.,† resigned as Epidemiologist and Acting Health Officer to become Health Officer of Alexandria. The position of Health Officer had not been filled since the advent of a new city administration. DR. BAGBY retired from the state service in July, 1940.

JOHN D. FAULKNER,† of Raleigh, N. C., Consultant Engineer in charge of Typhus Control, North Carolina State Board of Health, has just been

granted a Degree of M.S. in Public Health Engineering from the University of Michigan.

JAMES H. LE VAN, C.E.,† has been transferred from the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., to Atlanta, Ga., to be Engineer Liaison Officer in the office of the Army's Fourth Corps Area.

KATHLEEN M. LOGAN, R.N.,\* has resigned as Supervisor of Rutherford County, Tenn., after 10 years of service, to become Director of Nursing for Puerto Rico. FRANCES DUNHAM, R.N., will succeed Miss Logan after completion of her postgraduate work at Teachers College, Columbia University, New York, N. Y.

JOHN G. NORRIS, M.D., of Farmerville, La., has retired from active practice, to take charge of the Union Parish Health Unit, a position he formerly held.

THOMAS L. OWINGS, M.D., Health Officer of Pearl River County, with offices in Poplarville, Miss., has been appointed to a similar position in Lafayette County, succeeding MURPHY M. SIMS, M.D., of Oxford, who has gone into military service.

RALPH PORGES, Sanitary Engineer, formerly in charge of textile waste treatment studies conducted at Greensboro, N. C., under HERMAN G. BAITY, Sc.D.,\* for the Textile Foundation, is now connected with the U. S. Public Health Service, and has been doing stream pollution work on the Tennessee River watershed in co-operation with the State and TVA Sanitary Engineers.

CHARLES O. RAINEY, M.D., of Camilla, Ga., is on leave of absence from the Mitchell County Board of Health, to accept a temporary position as Area Medical Officer of the extracantonment area for Camp Stewart, at Hinesville.

GEORGE D. REED, who has been Assist-

ant Public Health Engineer with the U. S. Public Health Service on the Ohio River Pollution Survey for the past 2 years, accepted a position as Assistant Sanitary Engineer with the Kentucky State Department of Health, effective March 1, and will devote most of his time in the field of industrial hygiene.

CHARLES W. REID, M.D., of Coushatta, La., has been appointed Director of the Red River Parish Health Unit.

IRVING E. SIMMONS, M.D., formerly Director of the Nassau County Health Department in Fernandina, Fla., is the new Health Officer in Coffee County, Ga., with headquarters in Douglas.

#### Western States

CARL E. GREEN,\* of Portland, Ore., State Sanitary Engineer of Oregon, was elected President of the Oregon Section of the American Society of Civil Engineers for 1941.

ROY M. HARRIS, C.E.,† of Seattle, Wash., was called for active duty with the Civil Engineer Corps of the U. S. Navy, and reported the latter part of January. When his term of active duty is ended, it is hoped that he may resume service on the Committee on Shellfish of the Public Health Engineering Section of the American Public Health Association.

#### DEATHS

DR. EDWARD CLARK, former Health Commissioner of Buffalo, N. Y., died February 28, at the age of 85.

PETER O. SHEA, M.D.,† Director of Public Health of Worcester, Mass., for almost 10 years, died March 9, at the age of 70.

JESSAMINE S. WHITNEY,\* Statistician of the National Tuberculosis Association, New York, N. Y., died March 11.

\* Fellow A.P.H.A.

† Member A.P.H.A.

## CONFERENCES AND DATES

- American Academy of Political and Social Science. Philadelphia, Pa. April 4-5.
- American Association for the Advancement of Science. Durham, N. H. June 22-27.
- American Association of Pathologists and Bacteriologists. New York, N. Y. April 10-11.
- American Association of Social Workers. Delegate Conference. Philadelphia, Pa. May 30-31.
- American College of Physicians—25th Annual Session. Statler Hotel. Boston, Mass. April 21-25.
- American College of Surgeons. Hotel Statler, Boston, Mass. November 3-7.
- American Home Economics Association—34th Annual Meeting. Stevens Hotel, Chicago, Ill. June 22-26.
- American Hospital Association. Atlantic City, N. J. September 15-19.
- American Library Association. Annual Meeting. Boston, Mass. June 19-25.
- American Medical Association—92nd Annual Meeting. Cleveland, Ohio. June 2-6.
- American Physiotherapy Association—20th Annual Conference. Asilomar, Pacific Grove, Calif. July 13-18. (Graduate Program in Physical Therapy, sponsored by the American Physiotherapy Association. Stanford University Medical School, San Francisco, Calif. June 23-July 18.)
- American Public Health Association—70th Annual Meeting. Convention Hall, Atlantic City, N. J. October 14-17.
- American Red Cross—National Convention. Washington, D. C. April 21-24.
- American Society of Civil Engineers—Spring Meeting. Baltimore, Md. April 23-26.
- American Society of Heating and Ventilating Engineers—Summer Meeting. San Francisco, Calif. June 16-20.
- American Society of Planning Officials. National Conference on Planning, in coöperation with American Institute of Planners, American Planning and Civic Association, National Economic and Social Planning Association. Philadelphia, Pa. May 11-14.
- American Water Works Association—61st Annual Convention. Royal York Hotel, Toronto, Ont., Can. June 22-26.
- Indiana Section—Indianapolis, Ind. April 24-25.
- Illinois Section—Lincoln Douglas Hotel, Quincy, Ill. April 28-30.
- Pacific Northwest Section—Olympic Hotel, Seattle, Wash. May 8-10.
- Southeastern Section—Charleston, S. C. May 12-14.
- Ohio Section—Gibson Hotel, Cincinnati, Ohio. May 15-16.
- Montana Section—Hotel Florence, Missoula, Mont. May 23-24.
- Rocky Mountain Section—LaFonda Hotel, Santa Fe, N. M. September 18-19.
- Michigan Section—Grand Rapids, Mich. September 24-26.
- Minnesota Section—Minneapolis, Minn. October 9-11.
- Southwest Section—Fort Worth, Tex. October 13-16.
- California Section—Fresno, Calif. October 22-25.
- Kentucky-Tennessee Section—Nashville, Tenn. October 27-29.
- Four States Section—Baltimore, Md. November 6-7.
- Chamber of Commerce of the United States—29th Annual Meeting. Washington, D. C. April 28-May 1.
- Child Welfare League of America—Midwest Regional Conference. Chicago, Ill. April 17-19.
- Civil Service Assembly:
- Eastern Regional Meeting, Washington, D. C.. 3rd week in May.
  - Central Regional Meeting, Chicago, Ill. May 15-17.
  - Western Regional Meeting, Los Angeles, Calif. May 26-28.
- College Health Workers—3rd Annual Meeting. New Orleans, La. April 11-12.
- Colorado Public Health Association. La Junta, Colo. May.
- Conference of State and Territorial Health Officers of North America. Washington, D. C. Tentative date: Week of April 28.
- Dairy Industries Exposition. Concurrent with annual conventions of the International Association of Milk Dealers, and the International Association of Ice Cream Manufacturers. Automotive Building, Canadian National Exhibition. October 20-25.
- Florida Public Health Association. Orlando, Fla. December, 1941.
- Food Conference—under the auspices of the Institute of Food Technologists. Pittsburgh, Pa. June 16-18.
- Group Health Federation of America—Third Annual Convention. Los Angeles, Calif. June.
- Heating, Piping & Air Conditioning Contractors National Association. San Francisco, Calif. June 16-20.

- Idaho Public Health Association. Lewiston, Ida. October 6-7.
- Institute of Government. University of Southern California, Los Angeles, Calif. June 9-14.
- Institute on Industrial Hygiene—for U. S. Public Health Service nursing consultants, and selected nursing representatives of other national agencies. National Institute of Health, Bethesda, Md. April 14-19.
- International Association of Public Employment Services. Denver, Colo. June 2-5.
- Iowa Public Health Association. Des Moines, Ia. May 8-9.
- Michigan Public Health Association. Grand Rapids, Mich. November 12-14.
- Missouri Public Health Association. St. Louis, Mo. May 15-17.
- National Association of County Officials. Louisville, Ky. May 14-17.
- National Association of Purchasing Agents—Governmental Group. Chicago, Ill. May 26-29.
- National Association of Housing Officials. Cincinnati, Ohio. April 16-19.
- National Conference of Social Work. Atlantic City, N. J. June 1-7.
- National Education Association. Boston, Mass. June 29-July 3.
- National Foundation for Infantile Paralysis—Medical Committees. Semi-annual Meeting. Foundation Office, 120 Broadway, New York, N. Y. May 15.
- National Society for Crippled Children—8th Annual Seal Sale. March 21-April 13.
- National Student Health Association—Third Annual Meeting. Flint-Goodridge Hospital, New Orleans, La. April 11-12.
- National Tuberculosis Association. 37th Annual Meeting. Hotel Gunter, San Antonio, Tex. May 5-8.
- New England Conference on Tomorrow's Children—Second. Littauer Center, Harvard University, Cambridge, Mass. July 16-18.
- New England Health Institute—Eleventh. Under the sponsorship of the health departments of each New England state. General Theme: Public Health in National Defense. Hotel Statler, Boston, Mass. April 2-4.
- New Mexico Public Health Association. Gallup, N. M. October.
- New York State Association of Public Health Laboratories—25th Annual Meeting. School of Medicine, Syracuse University, Syracuse, N. Y. May 19.
- Northern Tri-State Medical Association. Tiffin, Ohio. April 8.
- Ohio Federation of Public Health Officials. Columbus, Ohio. May 23.
- Pacific Heating and Air Conditioning Exposition. Exposition Auditorium, Civic Center, San Francisco, Calif. June 16-20.
- Pacific Northwest Regional—Planning Conference. Seattle, Wash. May.
- Pennsylvania Public Health Association. Wilkes-Barre, Pa. May 28.
- Smoke Prevention Association of America, Inc.—35th Annual Convention. Ansley Hotel, Atlanta, Ga. June 3-6.
- Society of Illinois Bacteriologists—Spring Meeting. Board of Trade Building, Chicago, Ill. April 25.
- Southern Public Works Congress. Birmingham, Ala. April.
- Special Libraries Association. Hartford, Conn. June 16-19.
- State Charities Aid Association—State and Local Committees on Tuberculosis and Public Health. Hotel Commodore, New York, N. Y. May 20-21.
- Tennessee Public Health Association. Nashville, Tenn. May 19-21.
- Western Branch, American Public Health Association—12th Annual Meeting. San Diego, Calif. May 25-29.

#### Canada

- Canadian Federation of Mayors and Municipalities. Ottawa, Ont. June.
- Canadian Public Health Association—30th Annual Meeting. Chateau Frontenac, Quebec, Que. June 9-11.

#### Foreign

- International College of Surgeons. Mexico City, Mexico. August 10-13.
- Pan American Medical Association—8th Congress. Buenos Aires, Argentina. 1941.
- Second Inter-American Congress of Municipalities. Santiago, Chile. September 15-21.

MEETINGS OF AFFILIATED SOCIETIES  
and A.P.H.A. Branches

Society and Secretary

Next Meeting

ARIZONA PUBLIC HEALTH ASSOCIATION Marion E. Stroud, Room 100, Arizona State Bldg., Phoenix.	Phoenix, April 19-20
COLORADO PUBLIC HEALTH ASSOCIATION Helen Cannon, 3136 York St., Denver, Colo.	La Junta, May 2-3
CONNECTICUT PUBLIC HEALTH ASSOCIATION Mario L. Palmieri, M.D., M.P.H., 43 S. Main St., Middletown	Bridgeport, April 16
CUBAN PUBLIC HEALTH SOCIETY Dr. Carlos Pineiro, Instituto Finlay, Havana, Cuba.	To be announced
FLORIDA PUBLIC HEALTH ASSOCIATION Edward M. L'Engle, M.D., State Board of Health, Jacksonville.	Orlando, December
GEORGIA PUBLIC HEALTH ASSOCIATION Louva G. Lenert, 245 State Office Building, Atlanta.	Atlanta, May 29-31
IDAHO PUBLIC HEALTH ASSOCIATION Herbert C. Clare, State Division of Public Health, Boise	Lewiston, October 6-7
IOWA PUBLIC HEALTH ASSOCIATION Carl F. Jordan, M.D., State Department of Health, Des Moines, Ia.	Des Moines, May
MASSACHUSETTS PUBLIC HEALTH ASSOCIATION G. Donald Buckner, 69 Coolidge Avenue, Needham.	To be announced
MICHIGAN PUBLIC HEALTH ASSOCIATION Marjorie Delavan, State Department of Health, Lansing.	Grand Rapids, November 12-14
MISSOURI PUBLIC HEALTH ASSOCIATION Glen J. Hopkins, 204 N. Boonville Rd., Jefferson City.	St. Louis, May 15-17
NEW MEXICO PUBLIC HEALTH ASSOCIATION Frank W. Parker, Jr., M.D., P. O. Box 1086, Santa Fe, N. M.	Gallup, October
NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION Margaret Blee, Instructor in Nursing Education, University of California, Berkeley, Calif.	To be announced
OHIO FEDERATION OF PUBLIC HEALTH OFFICIALS W. D. Bishop, M.D., Darke County Health Unit, Greenville.	Columbus, May 23
PENNSYLVANIA PUBLIC HEALTH ASSOCIATION C. E. Houston, Department of Public Health, Washington, Pa.	Wilkes-Barre, May 28
PUBLIC HEALTH ASSOCIATION OF NEW YORK CITY Frank Kiernan, 386 Fourth Avenue, New York.	To be announced
SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION Ruth Grothe, State Board of Health, Columbia.	Myrtle Beach, May
SOUTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION Eunice Lamona, R.N., 6028 Harcourt Ave., Los Angeles.	To be announced
TENNESSEE PUBLIC HEALTH ASSOCIATION Dr. Robert H. Hutcheson, State Department of Health, Nashville.	Nashville, May 19-21
TEXAS PUBLIC HEALTH ASSOCIATION Alan C. Love, 303 West 15 Street, Austin.	To be announced
UTAH PUBLIC HEALTH ASSOCIATION S. E. Gilchrist, 105 South State St., Salt Lake City, Utah.	To be announced
WEST VIRGINIA PUBLIC HEALTH ASSOCIATION Dorothea Campbell, State Department of Health, Charleston.	To be announced
SOUTHERN BRANCH, A.P.H.A. P. E. Blackerby, M.D., 559 Sunnyside Drive, Louisville, Ky.	To be announced
WESTERN BRANCH, A.P.H.A. W. Ford Higby, 45 Second Street, San Francisco, Calif.	San Diego, Calif., May 26-30, 1941

Request for Application for Membership

I wish to apply for membership in the American Public Health Association. Please send me an application blank.

Name.....  
Print name in full and give degree

Street and City..... State.....  
For correspondence and the Journal

Present public health occupation.....

REQUIREMENTS. Persons professionally engaged or interested in public health work are eligible for election as Members of the Association.

DUES: Dues of Members are \$5.00 per year, which includes an annual subscription to the AMERICAN JOURNAL OF PUBLIC HEALTH. Persons joining the Association after July 1 are requested to pay \$7.50, covering a year and one half from July, 1941, to December, 1942.

AMERICAN PUBLIC HEALTH ASSOCIATION  
1726 BROADWAY AT 53TH STREET, NEW YORK, N. Y.

Physicians, parents and children  
cooperate in Tuberculin Testing with

## TUBERCULIN PATCH TEST (VOLLMER)

*Lederle*

THE "TUBERCULIN PATCH TEST (Vollmer) Lederle" is lending considerable impetus to that all-important phase of the nation-wide tuberculosis control program—case-finding.

The necessity of getting cordial cooperation no longer looms as an insurmountable obstacle when the "Tuberculin Patch Test (Vollmer) Lederle" is used. Parents are easily assured that the test is safe and will not cause any pain to their children. Children voice no objection—the test doesn't hurt; there is no needle involved, they know adhesive tape! Physicians appreciate the ease and dispatch with which they are able to conduct a school-wide or city-wide program.

Already the "Tuberculin Patch Test (Vollmer) Lederle" has been adopted for several state, city, and county testing programs, as well as by clinics, hospitals and practitioners all over the country. These include the city of Highland Park, Michigan, with a school system of about 10,000 pupils, and the states of New Jersey, Florida and Washington. The test has been given recognition in the Report of the American Academy of Pediatrics\*. It is Council-Accepted.



**PACKAGES:**

1 test; 10 tests  
and 100 tests.



Send for the booklet "Abstracts from published articles on 'Tuberculin Patch Test (Vollmer) Lederle.'"

\*Report of the Committee on Immunization and Therapeutic Procedures for Acute Infectious Diseases of the American Academy of Pediatrics, June, 1939.

LEDERLE LABORATORIES, INC.  
30 ROCKEFELLER PLAZA NEW YORK, N. Y.



# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

May, 1941

Number 5

---

---

## CONTENTS

PAGE

Appraising Public Medical Services . . . . .	421
<i>Louis S. Reed and Dean A. Clark</i>	
The Public Health Engineer in Municipal Health Practice . . . . .	431
<i>Henry F. Vaughan, Dr.P.H.</i>	
The Public Health Engineer and the City Health Officer . . . . .	435
<i>Abel Wolman, Dr.Eng.</i>	
Need for Greater State Supervision of Water Works . . . . .	440
<i>Isador W. Mendelsohn, C.E.</i>	
Disabling Sickness Among Industrial Workers . . . . .	443
<i>William M. Gafafer, D.Sc.</i>	
Discussion— <i>Richard D. Mudd, M.D., Ph.D.</i>	
Use of the Culture Method in the Clinical Management of Gonorrhea . . . . .	457
<i>George Sewell, M.D., Emilie Clarke, M.D., Dr.P.H., and Everett Nelson</i>	

*Continued on page vi*

---

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear. These are not to be regarded as expressing the views of the American Public Health Association unless formally adopted by vote of the Association.

---

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Reader's Guide in your Library.

---

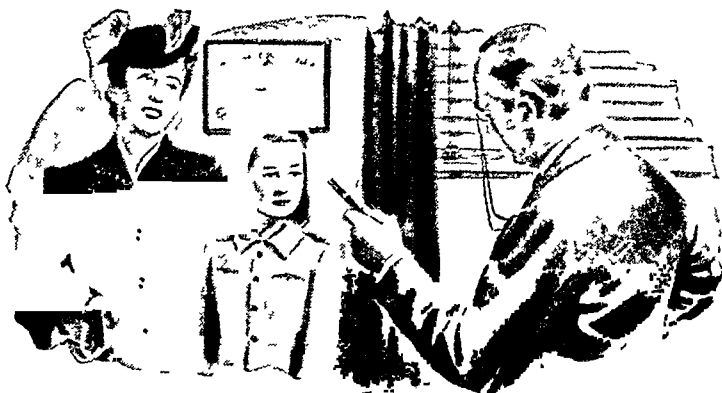
Published by the American Public Health Association at 374 Broadway, Albany, N. Y.  
Executive Office, 1790 Broadway at 58th St., New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States, Cuba and Mexico, South and Central America; \$5.50 for Canada; and \$6.00 for other countries. Single copies 50 cents postpaid. Copyright, 1941, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor, H. S. Mustard, M.D., 600 W. 168th Street, New York, N. Y.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 1790 Broadway at 58th St., New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.



*Q. We serve canned foods at our house, of course.  
But are they all right for children?*

*A. Indeed they are. Canned foods are nutritious and wholesome and include some of the most valuable sources of the dietary essentials which should be present in abundance in the child's diet.<sup>(1)</sup>*

(1) The nutritive values of canned foods have been the subject of numerous investigations, the results of which have repeatedly demonstrated the value of commercially canned foods as sources of the essential nutrients that should receive special attention in planning the child's diet. For further particulars the references below may be consulted. *American Can Company, 230 Park Avenue, New York, N. Y.*

1939. Accepted Foods and Their Nutritional Significance, Council on Foods of the American Medical Association, Chicago.

1939. Food and Life; Yearbook of Agriculture, U. S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D. C.

1939. Canned Food Reference Manual, American Can Company, New York.

1938. Nutrition Abstracts and Reviews 8, 281.



The Seal of Acceptance denotes that the nutritional statements in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

<i>Contents—Continued</i>	PAGE
Place of Maternal and Child Health Services in a Generalized Program in a Health Unit . . . . .	465
<i>William J. French, M.D.</i>	
A County Health Unit With Proper Functioning Maternal and Child Health Program . . . . .	471
<i>Isadore Dyer, M.D.</i>	
Medical and Dental Services for Dependent Children Under Public and Private Child Caring Agencies . . . . .	477
<i>Lawrence C. Cole</i>	
The Slossfield Health Center . . . . .	481
<i>Walter H. Maddux, M.D.</i>	
Proposed Method for the Bacteriological Examination of Flat Surfaces . .	487
<i>William G. Walter and G. J. Hucker, Ph.D.</i>	
Enforcement of Dishwashing Regulations Applying to Eating and Drinking Establishments . . . . .	491
<i>Walter von Dohlen Tiedeman, M.C.E.</i>	
Minimum Qualifications for Nutritionists in Health Agencies . . . . .	494
Subcommittee on the Educational Qualifications of Public Health Nutritionists— <i>Pearl McIver, R.N., Chairman</i>	
Selection, Training, and Supervision of County Sanitarians in West Virginia . . . . .	498
<i>J. B. Baker, H. K. Gidley, and Gilbert L. Kelso</i>	
EDITORIALS:	
The Caribbean Area and Tropical Health . . . . .	505
Complacency and Public Health Practice . . . . .	507
The Western Branch of the Association . . . . .	508
Letter to the Editor. <i>Homer Folks</i> . . . . .	509

*Continued on page viii*

*Report prices furnished upon request*

# POLLEN ANTIGENS *for* SPRING HAY FEVER

NATIONAL POLLEN ANTIGENS are standardized, thus affording dependable potency and facilitating minimum bulk doses measured according to the need of the individual patient.

Treatment consists of preseasonal subcutaneous injections before symptoms occur and during the usual period of maximum hay fever syndrome.

## POISON IVY

RHUS TOX ANTIGEN for poison ivy, Rhus Venenata Antigen for poison oak are aqueous alcoholic extracts, free from oil, quickly absorbed, not likely to cause tumefaction, and will retain their potency for 3 years.

*Literature upon request*

  
**THE NATIONAL DRUG COMPANY**  
**PHILADELPHIA, U.S.A.**

<i>Contents—Continued</i>	PAGE
Credit Lines: A Selective Digest of Diversified Health Interests— <i>D. B. Armstrong, M.D., and John Lentz, M.S.</i> . . . . .	510
A Question and an Answer. A Distinguished Report. Meet "Dr. Jones." Pictographs—"Handle with Care." Useful Catalogues. Concerning Some Health Publications. R.S.V.P. Notes on Annual Reports. Framingham, Mass., Establishes a New "Low."	
Books and Reports . . . . .	516
The Parasites of Man in Temperate Climates. Laboratory Manual for Physicians: Aids in Diagnosis and Treatment (7th ed.). Guide to Library Facilities for National Defense. Perchloron. Health Activities and Problems: An Experience Workbook for the Secondary School Student. Bacteriology in Neuropsychiatry. Back to Self-Reliance. Social Work Year Book, 1941: Sixth Issue. Notter and Firth's Hygiene (10th ed. rev.). Tuberculosis and Genius. Orientation in American Dentistry—Its History and Social-Professional Background. Diseases Transmitted from Animals to Man.	
Books Received . . . . .	521
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . . . .	522
Association News . . . . .	525
Applicants for Membership. Deceased Members. Health Conservation Contests.	
Employment Service . . . . .	529
News from the Field . . . . .	531
Summer School Courses in Public Health.	
Conferences and Dates . . . . .	543

---

# American Journal of Public Health and THE NATION'S HEALTH

---

Volume 31

May, 1941

Number 5

## Appraising Public Medical Services

LOUIS S. REED AND DEAN A. CLARK

*Senior Economic Analyst; and Surgeon (R), Division of Public Health Methods,  
National Institute of Health, U. S. Public Health Service, Washington, D. C.*

ONE of the foremost health tasks of the present day is to elevate the standards of public tax supported medical services for the needy and medically needy. Almost unnoticed, such programs have reached a size which gives them great social and fiscal importance. There are now some 5,500,000 persons on general relief and another 3,200,000 receiving old age assistance, aid to dependent children, and aid to the blind through federally aided programs. Probably at least \$50,000,000 of federal, state, and local funds\* were spent in 1939 for the general medical care of these needy persons—this sum being exclusive of all expenditures for hospitalization for tuberculosis and mental illness, and for public health services. Besides the re-

lief group there is an indefinite number of medically needy who received an unknown amount of tax supported care. Indeed, in a number of localities medical expenditures for the medically needy have been found to equal or exceed those for the relief group. There is no accurate information as to the total amount of public funds expended in the country for general medical care for the needy and medically needy together. In a single New York county, however, \$1,500,000 was spent for this purpose in 1939. A minimum indication of the national total is given by the 1935 Census of Hospitals which shows that \$106,000,000 of the income of general hospitals, exclusive of those federally owned, was derived from tax funds.

\* This is estimated by assuming that medical costs were 5 per cent of relief and assistance grants from all sources, which amounted to about \$1,000,000,000 in 1939. The portion of federal funds used for medical care is relatively small, however, because of the provision of the Social Security law that federal matching can only be obtained for funds dispersed as "unrestricted" cash grants to needy individuals. Giving cash for medical costs to recipients of the three federally aided assistance programs has been attended with great difficulty in local administration and control. As a result, many communities have found it necessary to supply these persons with large amounts of supplementary medical care furnished in kind and paid for exclusively from local and state funds.

### 1. NEED FOR APPRAISAL

Considering the magnitude of these programs, surprisingly little is known about them. Here is a form of organized public medical care going on in thousands of localities throughout the country. What agencies are financially and administratively responsible? How is the provision of care organized? To what extent is there coördinated plan-

ning and technical direction of the program? How adequate is the care provided? What controls are there to assure that good care is provided at reasonable cost? In short, how—and how well or how poorly—is care to the indigent and medically needy now being provided?

Generally, the programs are administered by public welfare agencies; rarely do health departments participate in them. In a few states the welfare medical programs are state-wide, but in most places the responsibility of providing medical care to the indigent and medically needy is borne by the local communities with little supervision or aid from the state government. Surveys made by the American Public Welfare Association<sup>1</sup> and others have shown an almost infinite variety of arrangements for providing this care. In many localities several different agencies administer parts of the program, and there are often duplications and gaps. Frequently there are serious deficiencies in the care provided and loose and uneconomical administration.

In short, present public medical care programs have had a rapid but uncontrolled growth, and it is important to improve the caliber of their work, including both the administration and the quality of care provided. As Dr. Gertrude Sturges has well said: "Unless real progress is made in coördinating and improving existing governmental machinery for medical care administration, additional expenditures, however great, may not result in an adequate well rounded program for medical care."<sup>2</sup>

The first step in elevating the standards of public medical services is to examine and appraise those now existing. There is much experimentation going on, but the results have been of little general use because they have not seen the light of day.

Appraisal requires agreement on the

aims or objectives of these programs. This should present little difficulty. The objectives obviously should be to provide adequate care to those who come within the scope of these programs and to furnish this care at the lowest cost consistent with fair remuneration to physicians, hospitals, and other agencies providing service and supplies. There are three parties—the welfare clients, the professions and agencies giving service, and the taxpayers—whose interests must be served, and the effectiveness of a program must be appraised from the point of view of each of these parties.

## 2. APPRAISAL OF GENERAL ORGANIZATION OF A PROGRAM

The first point to be considered in appraising a public medical care program is whether the overall organizational arrangement is conducive to effective operation.<sup>3</sup> Either the entire program should be administered by a single agency or there should be some device, such as an interdepartmental committee, to insure that it will be administered as a coördinated, balanced whole. The need for this is illustrated by one community studied by the authors in which physicians' care in the home and office was administered by one agency while hospitalization was administered by another. Here the agency providing physicians' care in the home and office tended to conserve its funds by sending patients into the hospital—a practice obviously leading to an increase in the cost of the program as a whole. Another instance of the need for coördination was seen in a locality where such cases are on record as one in which a health department nurse, a welfare department nurse, and a school nurse all visited a single case of measles on the same day.

There has been much discussion as to whether these programs should be administered primarily by health or by welfare agencies. At present, the ques-

tion of which of these agencies should have administrative responsibility is less important than whether there is close coöperation between the two in the planning and operation of the program. It is, however, pertinent to note that as medical care programs become increasingly occupied with provision of care to the medically needy, they depart from the strictly welfare field and tend to become principally community health programs. In a number of localities observed by the authors in New York State, the provision of care to the medically needy had become so extensive that often 30 per cent or more—in one town close to 70 per cent—of all the expenditures of the welfare agencies were for medical care, most of it for persons receiving no other form of public aid. Where so large a proportion of the activity of the welfare agency is in the field of health and for the benefit of persons who are not relief clients, it would seem that this activity might be more logically carried on by the health agency.

A second consideration under appraisal of the administrative organization is whether any device exists for obtaining the advice and coöperation of the medical profession, the hospitals, and other professions and agencies concerned with the provision of care. Obviously the coöperation and advice of these groups in both the planning and execution of the program are desirable and may best be sought through their official organizations. It is also desirable that a balance should be struck between these groups in order that the special interests of each may be held in check and proper coördination obtained. This can best be achieved if the representatives of these groups consider the problems of the program jointly through a device such as an advisory health council which includes representatives of all the interested parties. Committees concerned

with the interests and problems of particular groups, such as the physicians, hospitals, dentists, nurses, pharmacists, etc., should be subcommittees of this main council.

A third main consideration in the appraisal of the overall organizational set-up is whether the program has qualified direction and administration. There are involved several different functions, each of which calls for special skills which it may not be possible to find in a single person. Obviously the program as a whole needs to be under the direction of a single individual who will be responsible for it as a whole and who will be qualified to know whether the program is operating satisfactorily, whether it is in balance, and whether the costs are reasonable, etc. Preferably such a person should be a physician, but this is not essential if he has sufficient knowledge of the medical field to enable him to direct the program in the same sense in which a lay superintendent directs a hospital.

There must also be provision for professional supervision of the quality and adequacy of each type of care—physicians' service to be supervised by a physician, dentistry by a dentist, nursing by a nurse, etc. If the person who directs the entire medical program is a physician, he may at the same time exercise professional supervision over physicians' services. When the size of the program justifies it, special supervisory physicians, dentists, and nurses can be employed on part- or full-time. Supervision may also sometimes be obtained from local health officials. Where such methods are not feasible, these supervisory functions can often be performed satisfactorily by voluntary advisory committees of the practitioners in question, since a program would have to be quite large in order to be able to afford even the part-time services of a supervisory practitioner in



each field. Indeed, the small scale of many welfare medical programs often makes it difficult for them to have the qualified administration and professional supervision which is desirable. In such instances, a possible solution of the problem is for several small jurisdictions to consolidate their welfare medical programs and operate them on a regional basis.

Of course, in appraising the professional supervision of any program, one must be careful to consider not only what devices exist, but how effective they are in practice.

Allied to the supervision of quality of service is the supervision necessary to assure that the physicians provide sufficient service if paid on a salary basis, and do not bill for excessive services if paid on a fee basis. It is clear from the surveys made by the authors that a lay person cannot successfully "control" the amount of service given by physicians, and that any attempt in this direction is bound to create friction between the administering agency and the physicians. Under free choice, fee for service plans, there apparently will usually be a small proportion of the physicians who will make more calls than are medically necessary, and any such tendencies must be controlled or the plan will surely fail. Such supervision can only be carried out by a physician employed by the public agency or by a committee of the practicing physicians themselves. If the latter, it is important to know whether the funds to be used are unlimited or whether the agency appropriates a stipulated amount of money, the bills of physicians being reduced *pro rata* if in the aggregate they exceed the amount allotted. Without some such arrangement, experience seems to show that the physicians do not have sufficient incentive to review rigorously the bills for service.

Thus in appraising a public medical

care program, it is important at the beginning to learn whether the program has such an overall organization, qualified direction, and suitable professional supervision as will make for successful operation.

### 3. APPRAISAL OF ADEQUACY OF CARE PROVIDED

The next main questions to be faced are whether the program is actually providing adequate care to those for whom it is responsible—whether the scope of care provided is complete, the quality of service high, and the quantity sufficient.

*Scope of Services*—All those services should be provided which are necessary for adequate health care. In most programs, physicians' and hospital care for serious illness of an emergency character are usually provided, but the appraiser must learn whether care for minor and chronic illnesses is also furnished, what specialist services are offered, whether rehabilitation through "elective" surgery is emphasized, and what provisions are made for dentistry, home nursing, drugs, eye-glasses, appliances, special diets, etc. Not only should the range of medical services available in the community be studied but, equally important, the extent to which they are all utilized by the welfare medical program. Sometimes, indeed, it may be desirable for the agency administering the welfare program to take the initiative in introducing new types of medical service, thus helping to raise the medical standards of the whole community.

*Quality of Care*—It is difficult to appraise directly the quality of physicians' care provided in the home and office, because public agencies seldom require more than a mere report of the diagnosis, and private medical records are rarely available to the appraiser. The opinions of welfare patients may, to some extent, reflect the quality of serv-

ice they receive, but more valuable is knowledge as to which physicians are performing the bulk of services for welfare clients, and as to the medical qualifications of the physicians. At first sight it might seem that a free-choice plan would result in a wide distribution of the services among all the physicians of a community. In practice, however, a majority of the services are often performed by a small proportion of the physicians—a situation which makes it necessary to evaluate the qualifications of the physicians actually furnishing the care rather than those of all the physicians in the community. It is also important to learn whether any provisions exist for limiting certain types of specialist and surgical work to designated physicians of proven ability in these fields.

Where there is a salaried plan it is perhaps easier to appraise the quality of service, for one may readily judge the qualifications of the salaried physicians and the conditions under which they give service. Here it is particularly important to know whether the amount of service is commensurate with the salaries received. Such plans may easily fail, on the one hand, if the physicians give insufficient service or, on the other, are expected to crowd into the day more work than is reasonable.

As with physicians' care, so with the other services, dental and nursing care, hospitalization, etc.—in each case the quality of service must be appraised. Here again, the standards of the persons and institutions actually providing the care for the welfare group, as distinguished from all those in the community, must be considered. In the case of hospitals, for example, it must be noted whether welfare clients are hospitalized in institutions which also serve the general population, or whether they are cared for in public institutions that serve only the indigent and medically needy. The standards of indi-

vidual hospitals may, of course, be judged in part from membership in the American Hospital Association, approval by the American College of Surgeons, registration with or approval for internship by the American Medical Association, etc.

Any appraisal of the quality of care is incomplete without information regarding the continuity of the care given. Is the patient sent from one physician, clinic, or hospital to another indiscriminately, or is reasonable continuity of service assured? Is there suitable provision for follow-up on puzzling and chronic cases? In some programs, for example, clients have free choice of physicians for care in the home, but if ambulatory are instructed to go to clinics, and if hospitalized are served by the physicians on ward service. Under these circumstances, the patient may be seen by one physician at home, another in the clinic, and a third in the hospital. It is important to learn if there is any mechanism whereby exchange of medical information among these physicians can be effected. In some instances, patients are admitted or discharged from the hospital without any notification being sent either to the welfare worker in charge of the case or to the family physician. Seldom is any clear-cut responsibility for follow-up assigned to a medical social worker or a physician.

A similar problem exists with respect to coordinating the emotional, social, and economic factors of the patient's life with his illness and his treatment. Nothing is more apparent in modern medical practice than the fact that satisfactory care cannot be given without careful consideration of all these elements of a case and without proper coordination between medical and social services.

*Quantity of Service*—The quality of service cannot be considered properly apart from its quantity. For large

groups of persons, the annual need for medical services remains relatively stable from year to year, although for any one individual this need may vary enormously. This fact is, of course, the basis for all health insurance plans. A convenient measure of quantity of service, therefore, is the number of various services furnished in a year to a known population group divided by the total number of eligible persons, sick or well, in the group. This operation reduces the quantities of service to an annual per capita figure which allows accurate comparisons of the amount of service rendered under plans of various types in different parts of the country. Figures of the per capita volume of care must be calculated separately for general relief, old age assistance, aid to dependent children, etc., since because of their age composition, these groups will require different quantities of care. Such quantitative figures are usually difficult to obtain for various reasons. Thus, the records of services received by any particular group (*i.e.*, home relief, old age assistance, etc.) seldom are isolated so that they may be related to a known population base. Also, visits to physicians and clinics, days of care in hospitals, etc., where welfare departments do not pay for them on a per item basis, are rarely recorded with accuracy. It is obvious that no reliable estimates of quantity can be made in the absence of such data.

In a number of programs in two states (New York and Minnesota) where figures were especially compiled for purposes of the surveys made by the writers, the average annual number of home calls per relief recipient ranged from 0.06 at one extreme to 3.6 at the other. For old age assistance groups, the analogous figures ranged from 0.7 to 8.5 calls per person per year. The average number of office or clinic calls ranged from 0.2 to 3.7 for home relief

recipients and from 1.0 to 5.0 for old age assistance.

It is clear that such differences indicate a great disparity in the services supplied, and suggest that in some of these programs an inadequate volume of care is being provided, or that in others excessive amounts of care are being paid for. From the rather meager experience data now available, it is as yet difficult to fix upon any precise range of figures which may be established as a norm. As more data from welfare and insurance experience becomes available, it will be possible to erect such norms, and they will be of great value in the appraisal of programs.

In comparing the per capita volume of medical care provided to an indigent population with that ordinarily purchased by self-supporting families, it must be borne in mind that the frequency of illness among relief or assistance groups is unusually high and that they will require more care than the normal population group. The extent to which this is so will, of course, vary from year to year, depending upon the relative importance of unemployment and sickness as main causes of people coming on the relief rolls.

Thus, relief and assistance recipients undoubtedly require more hospital care than normal population groups. In various programs in New York and Minnesota, the volume of general hospital care provided to general relief clients ranged from 1.4 to 3.1 days per capita annually, and the admission rates from 8 to 20 per 100. The average length of hospital stay per case ranged from 10.8 to 22.3 days. Under hospital care insurance, on the other hand, about 10 persons per 100 require hospital care in any one year, the average length of stay is slightly less than 10 days, and the average number of days of hospital care amounts to slightly less than 1 day per person per year. In time it probably will be possible also to

establish norms by which one may gauge whether an indigent group is receiving insufficient or excessive hospital care.

Similar quantitative data must obviously be obtained also for dental and nursing services, for prescribed drugs, for appliances, etc. Only with such figures in hand is it possible to know if a proper balance of services and supplies is being furnished or if certain items are disproportionately large or small in amount. Unfortunately, few welfare medical programs have seen the value of compiling data on the volume of service rendered.

#### 4. REMUNERATION OF PHYSICIANS, DENTISTS, HOSPITALS, ETC.

Physicians, dentists, hospitals, nurses, pharmacists, etc., should be adequately remunerated for their services to the needy and medically needy. This is necessary not only out of fairness to those rendering care, but also because, in the long run, it is essential for the provision of care of good quality. Fair remuneration does not necessarily mean, however, that physicians, hospitals, and others should be remunerated at the same rates as those ordinarily charged private patients. Promptness and certainty of payment from a public agency, in contrast to the sizable losses on uncollectible bills from private patients, are justification for a lower schedule of fees. The fact that the public medical program may considerably increase the amount of paid medical service in a community may also justify a schedule of fees below the ordinary one. In the case of voluntary hospitals, the eleemosynary character of these institutions, their exemption from taxes, and the support received through gifts or contributions must be taken into account.

In appraising the adequacy of remuneration, both the rate per unit of service and the total payment afforded for the work as a whole should be taken into consideration. Thus one basis of

judging the fairness of remuneration afforded, say, to physicians is to inquire what would be the gross income of all the physicians in the community if, as a group, they derived the same per capita income from the general population as they derived from those on relief. In one community surveyed, it was found that if the profession as a whole derived the same annual income per head from their private patients as they did from those on relief, every physician would have had, on the average, a gross income in excess of \$11,000 per year.

From the point of view of those providing care, the conditions under which services are rendered are also of great importance. When these conditions are faulty they may be a far more serious source of dissatisfaction than a low rate of remuneration. Obviously the professional arrangements under which care is authorized, given, and paid for must be conducive to the provision of good care. The relationships between physician and patient necessary for good care should be encouraged rather than hindered by the program. Physicians must be able to obtain necessary specialist care, consultation service, hospital care, proper drugs, etc., for their patients. The reports or "paper work" required of physicians must be held to the minimum compatible with proper operation of the program.

#### 5. ECONOMY OF OPERATION

Much can be learned about the effectiveness of a program, from the point of view of the economy with which it is conducted, from the annual expenditures for medical care per head of the eligible population. The same precautions must, of course, be observed here as in calculating the annual per capita quantity of services.

Different relief and assistance medical programs show a wide range in their per capita expenditures. Thus, in the

programs surveyed, a range of medical costs was found for old age assistance from \$10.16 to \$37.81 per person per year, and for general relief from \$7.82 to \$28.88. Part of this divergence is due to the fact that some welfare agencies pay for certain services—physicians' care in the hospital, for example—which in other programs are provided gratuitously, or that charitable clinic facilities are available in some communities but not in others. But even for the same categories of service one finds wide differences between localities—for old age assistance recipients, from \$2.83 to \$27.21 per capita for physicians' services in the home and office alone; from \$1.36 to \$14.97 for hospital care; from less than \$1 to \$6.65 for drugs. Such differences may reflect the fact that in some programs an inadequate quantity of service is being provided or that those supplying the service are unfairly remunerated; on the other hand, they may mean that in other communities excessive quantities of service are being provided or that too high rates are being paid per unit of care. Only by comparing costs with quantities of service can a proper judgment be made.

With respect to costs, also, it should be possible with further experience and analysis to establish norms of reasonable per capita expenditures for medical care to indigent groups, by which the expenditures of any one program may be evaluated.

The annual per capita expenditures for medical care, both in toto and for each item separately, may constitute useful tools for the evaluation of a program but, like most useful tools, they can effect harm if not properly used. Most decidedly, that program cannot be considered the best which has the lowest per capita expenditures—it is low cost in relation to the provision of adequate care and fair rates of remuneration which is the aim.

The relationship to each other of the expenditures for various items of care may also be useful in the evaluation of a program. Communities have been observed in which 85 per cent of all expenditures were for hospital care—a fact which indicates lack of balance. In another program expenditures for drugs for ambulatory and domiciliary patients exceeded the expenditures for physicians' services in the home and office—again an indication of poor balance, of poor control in prescribing, and possibly of poor and hurried physicians' care. Again, the negligible expenditures under some programs for dental care and nursing service are not only indicative of gaps in the care provided, but possibly of wastefulness in other parts of the program.

*Record Keeping*—Finally, an important point of appraisal is to determine whether those statistical and accounting records are being compiled which are necessary for enlightened and effective administration, for self-knowledge and self-appraisal. Thus, unless those administering a program know how much is being spent for medical care per eligible client, the distribution of this expenditure among the main items of care, the per capita volume of different types of care being provided, the per unit cost of prescriptions, eyeglasses, dentures, etc., they lack the most rudimentary information for intelligent operation of the program. It is the exceptional program at present which either compiles this essential information or knows how to use it. In addition, it is desirable to know the morbidity among the population, by age, sex, and diagnostic classification, and the volume and cost of care per case of illness by main diagnostic classifications. Indeed, with proper record keeping, these programs can yield valuable information about the incidence and duration of disease in a large section of the population.

## 6. THE MEDICALLY NEEDY

Provision of care to the medically needy is in reality a separate problem from that of providing care for relief groups, and appraisal requires other procedures. One reason for this is that in the case of the medically needy one does not know the population base, *i.e.*, the total number of persons eligible for care. Hence it is impossible to use such tools as the per capita volume of care, and the per capita cost of providing the care.

Appraisal of care for the medically needy requires, first of all, the determination of who should be classified in this group. By no means can it be assumed that the medically needy comprise only those otherwise self-supporting individuals who, during any given period, apply for and obtain medical care at the expense of public or private welfare agencies. In addition to these, there is the much larger group who are unable to afford the medical care they need, and who do not apply to public or private agencies for free care, but simply go without. The successful operation of any program for the medically needy must therefore be measured not only by how well it provides care to those who obtain it, but, far more important, to what extent it meets the medical needs of the entire low income group. It is certainly significant that in every community visited by the writers, it was the opinion of both welfare workers and physicians that the relief population was receiving much more nearly adequate medical care than was the low income group. Thus, the term "medically needy" appears to connote not so much a definite population as a problem.

The aim of any program for providing care to the medically needy should be to supplement the care which persons of low income now obtain so that all of them receive adequate medi-

cal care. Therefore, appraisal of programs for the medically needy is in reality a much larger and more difficult undertaking than the appraisal of programs for relief groups. Only a few of the major elements in appraising such programs can be considered here.

Perhaps the most important point to be evaluated is the standard by which economic eligibility of the individual to receive care at public expense is determined.<sup>4</sup> This standard must not be such as to deny care to those who cannot purchase it privately or, what is perhaps more important, who would otherwise go without. In many communities the care for the medically needy to be provided by public agencies—aside from that for tuberculosis, venereal disease, and infant and maternal health—consists almost entirely of hospital care. This is because it is usually assumed by welfare agencies that a person not actually on the general relief rolls is himself capable of procuring necessary home and office service from physicians. However, due to ignorance, unwillingness, or inability to pay, many such persons do not seek a physician in time. As a result, when the medically needy person becomes a concern of the public agency, his illness has frequently reached the stage at which hospitalization is necessary. One may reasonably inquire whether the provision of care at public expense at an earlier stage might not in some cases save the cost of hospitalization.

The principles involved in the provision of medical care to relief and low income groups are quite different from those involved in providing food, shelter, and clothing to relief clients. It may be that general relief must be given in such a way that people will be reluctant to accept it. With respect to medical care, however, a policy of making this care readily available to all individuals of low income will probably prove most desirable for the community

in the long run. From this point of view there would be an advantage in having the administration of medical care for both the medically needy and the indigent carried out by a different agency from that which provides general relief.

#### 7. CONCLUSION

Existing public medical services for the indigent and medically needy serve large groups of the population, involve large expenditures of public funds, and are of great significance from the standpoint of general community health. Such services do not have to be conducted according to poor medical standards, but, on the contrary, offer opportunities, through proper organization, to raise the whole level of medical practice in a community. It is of the utmost importance to make these services more nearly adequate and to improve their administration. The first step to this end is to examine existing services, to bring them to the light of day. Concerning our present-day public medical services, one may say what the Webbs said almost 30 years ago concerning the English Local Health Authorities—"So little is made known about them that they are not even afforded, to any great extent, the bene-

fit of mutual emulation."<sup>5</sup> Perhaps the greatest single step which could be taken to improve these local and state services would be the provision of federal aid, not only because of the financial assistance, but, even more important, because of the stimulation toward improved standards of service and toward efficiency and effectiveness which federal aid can be made to give. The provision of federal aid under the Social Security Act for public health work and for general assistance to the aged, dependent children, and blind has caused an almost incalculable expansion and improvement of these services at the state and local levels. It is likely that a similar improvement could be effected through federal aid to the states for medical care for the indigent and medically needy.

#### REFERENCES

1. American Public Welfare Association. *Report of Committee on Medical Care*. June 1, 1938. Also *Cooperation in the Administration of Tax Supported Medical Care*. Aug., 1940.
2. Sturges, Gertrude, M.D. *Public Medical Service As It Is Today at State and Local Levels*. *Social Service Rev.*, 14:501 (Sept.), 1940.
3. American Public Welfare Association. *Organization and Administration of Tax-Supported Medical Care*. 1939, 8 pp., mimeographed.
4. American Public Welfare Association. *Principles Underlying the Determination of Eligibility for Medical Care*.
5. Webb, Sidney and Beatrice. *The Prevention of Destitution*. Longmans, Green, 1912, p. 36.

This study is reported as one of a series conducted with coöperation of the Subcommittee on Organized Care of the Sick of the Committee on Administrative Practice, American Public Health Association.

# The Public Health Engineer in Municipal Health Practice\*

HENRY F. VAUGHAN, DR.P.H., F.A.P.H.A.

*Commissioner of Health, Detroit, Mich.*

DURING the middle and latter half of the 19th century, when our large cities, and especially our seaboard communities, first gave serious consideration to the establishment of their official health departments, a hazy cloud of uncertainty and ignorance hung over the head of the sanitarian. There was no noteworthy development in the scientific field of public health prior to the days of Koch and Pasteur who, with their colleagues, explored the field of bacteriology and shed new light upon the problems of epidemiology. From the early days of Greek medicine, the medical mind had associated human health with environment. The great Greek philosophers had argued with reason that there must be a common cause responsible for the devastating epidemics which had afflicted mankind throughout the ages. What other could humans have in common than the air, water, and the inanimate surroundings to which they were exposed? Thus our first health departments accepted a heritage which molded the structure of our community health services. More concern was felt for those nuisances offensive to the olfactory nerve, our sense of cleanliness, and our desire to be relieved of obnoxious

conditions which touched our sensitivity to filth and dirt.

Among our heirlooms was the sanitary inspector whose appointment then as now was considered a matter of political expediency. Usually he was well versed in the art of vote getting, but knew little concerning the science of disease prevention or life promotion. Upon the premise that contagion resulted from miasmatic conditions, from unsavory odors caused by the accumulation of filth and sewage, or the gaseous emanations from foul drains and stagnant pools, health departments were manned with drain and plumbing inspectors and supervisors who ruled the town scavengers.

The lay sanitary inspector saw birth in such an environment, and greater depth and vision was not given to his work until the laboratorian gave us a glimpse of the true nature of infection and the specific relationship between filth and disease. Too frequently this inspector of the vintage of eighty years ago continues to occupy a prominent position in our current health program.

Concurrent with the advance in sanitary knowledge and more especially with our endeavor to suppress epidemics of the enteric diseases such as typhoid, cholera, and dysentery, a new expert grew up in the field of sanitary engineering. The spectacular reductions in death rates from water- and filth-

---

\* Read at the Annual Conference of Municipal Public Health Engineers at Detroit, Mich., October 7, 1940.



borne infection are well known to all of us. The expansion of sewerage systems, the selection of safe sources of water with filtration and chlorination, the prompt, sanitary, and adequate disposal of garbage and refuse are the handiwork of the sanitary engineer. This engineer grew up from our engineering colleges and institutes of sanitary biology. His basic training was in the engineering sciences but he became concerned with the broad problems of epidemiology and their relationship to his mother profession. He has become an expert in the environmental aspects of disease prevention and has used his knowledge of the design, construction, and operation of engineering works as a means of promoting health among the masses.

Briefly then, we have witnessed the advent of a sanitary inspector with a good nose for nuisance abatement, and quite independently a sanitary engineer who is aware of the practical application of his engineering knowledge to a furtherance of health. Can these two types be amalgamated or must we start anew with another type of sanitarian with the best features of each who combines with his training, expertness and administrative tact? Salvaging is frequently a profitable occupation but seldom is the rebuilt structure as good as one which is new from its very foundation. Every modern health department, whether urban or rural, needs the services of a public health engineer. A few apt sanitary inspectors can be reshaped and enlightened regarding the health potentialities of environment control. This, surely, is the exceptional rather than the usual circumstance. It is extremely difficult to reeducate the old-line sanitary inspector in biologic concepts and etiologic factors which govern modern health conservation. There are many of the old-school sanitary inspectors, however, who can contribute to public health engineering

under competent supervision, if there are assigned to such individuals routine responsibilities not commanding initiative from the technical viewpoint. It is likely that there will continue to be many with basic training in sanitary engineering who will broaden their horizon with biology, bacteriology, virology, public health administration, and health education. The future, it is hoped, will furnish an ever-increasing number of public health engineers who have been exposed in their school curricula to a well rounded education in the broad field of public health. It is this type of individual whose services are needed by every health department.

Let us examine for a moment the character of this public health engineer who biologically is a variant of the sanitary engineer rather than the lay inspector. He should have received his basic training in the engineering and biologic sciences, so that he may possess the fundamental technical knowledge required for his administrative responsibilities, and that he may instruct his personnel and correlate the activities of his bureau with the broader responsibilities of the local health department. It is desirable for all of us to have a home profession on which we may fall back for consolation and relief during the turbulent days of political strife which too frequently harass all public health workers. With some exceptions our technically trained health personnel will come from the fields of medicine, engineering, dentistry, and nursing, and under all circumstances a fundamental training in biology, chemistry, and physics fortifies the individual for his future career in public health. Furthermore, our public health engineer should expose himself to the broad aspects of public health work taught at university level so that he may become conversant with the other technical fields which border closely upon his chosen avocation.

Epidemiology, with its significant implication of the study and control of all diseases which afflict the masses, embraces in its wide-reaching field the work of the public health engineer as well as the contributions of the physician, biometrician, and laboratorian. It is essential that the engineer not only be familiar with the responsibilities of the public health physicians and other technicians, but he must possess a professional viewpoint which permits administrative determinations on procedures which affect both physician and engineer and which can be arrived at only through carefully planned training in the health sciences. Of course the physician and engineer will grow up through different routes but these must converge into an inverted Y so that the epidemiologic principles which govern all health work can be superimposed upon the point of juncture. The physician should know something of engineering; the engineer should be conversant with the principles of biology and physiology; each should develop a wholesome respect for the judgment of the other, a respect which is engendered by the breadth of professional education; each to regard the other as the expert in his particular field of specialization.

The criteria for good epidemiology include something more than tables, charts, and spot maps which depict a before-and-after picture. Successful health administration digs deep into the fundamental principles of education which activate human behavior and response in terms of life conservation. The public health engineer must not only share the assignment in the broad health department program to extend health knowledge, but he must be a leader in generating individual family and community response to support the department's work and to translate into terms of lay compliance the principles of sanitary science. The public health

reflects our success in securing lay coöperation, be it expressed in terms of diphtheria, tuberculosis, or syphilis control, or in the construction of sewers, filtration plants, sanitary swimming pools, adequate plumbing, or general municipal cleanliness. The public health engineer must be possessed of a buoyant personality and ability to command the respect not only of his fellow health workers, but that of his coworkers in the other divisions of government—the building and public service departments, the water supply agency, and the city engineer's office. Respect for his judgment and professional standing will automatically create demands for consultation and joint direction and supervision of public activities which possess a health significance even though they are not administratively within the jurisdiction of the health department.

Many otherwise good health programs have been stamped with failure merely because the mechanical engineer who pumped the city's water supply or the maintenance engineer in some riverside industry could not conceive the important health aspects of broken mains and leaky cross-connections and neglected to submit his problems concurrently to the health department. The employment of a well trained, efficient, affable public health engineer will promptly bring such all-important health determinations to the health department. Architects will want advice on questions of housing, new-building construction and old-building remodeling, expressed in terms of air space, light, and heat to assure adequate ventilation, comfort, and freedom from unwanted hindrances to the development and maintenance of positive health. Mechanical engineers will seek advice in laying out plans for industrial plants, hotels, and public buildings, so as to avoid the dangerous connections between polluted and safe waters,

drains, and plumbing lines. The faithful pilgrims continue their religious rites in the polluted waterways of congested Asia, and spread cholera and dysentery far and wide, while not infrequently an ignorant plant engineer sets the stage for a similar scene in our country by tying together through leaky check valves a potable and a polluted water supply.

Food and milk inspection demand technical supervision, especially in designing and maintaining milk pasteurization plants void of mechanical imperfections, which engender false security and give the public an unwarranted sense of safety and freedom from milk-borne infection. Rodent and insect control require supervision by the public health engineer to ward off the encroachment of plague, typhus, epidemic jaundice, and malaria, and to add to the general comfort and wholesomeness of urban life. Industrial hygiene is replete with tasks for our engineer, being a speciality with a physiologic

basis abounding with engineering expression.

Each transatlantic liner has its commanding officer, its administrator the captain. The second officer in control, in the absence of the captain or his authorized representative, is the engineer. In our health services, there is like need for this public health engineer, an adviser and coworker with the health officer to provide direct supervision for the sanitary services and to establish a broad correlation with all aspects of an epidemiologic service. His training must be both technical and comprehensive; he must be a diplomat and a teacher; he must be an administrative leader in the planning and operation of the health department services. Every municipal health service should employ one or more public health engineers. Their services engaged, they should be given the opportunity of self expression and of leadership, subject to the friendly counsel and guidance of the health commissioner.

# The Public Health Engineer and the City Health Officer\*

ABEL WOLMAN, DR.ENG., F.A.P.H.A.

*Professor of Sanitary Engineering, the Johns Hopkins University, Baltimore, Md.*

ONE of the mysteries of the evolution of public health administration in the United States is the lag in sanitary engineering administration in municipalities behind that in the states. The rapid strides which state sanitary engineering practice has made since 1910 have not been paralleled by a corresponding activity within the municipality.

It is difficult to isolate the exact cause of this delayed phase of public health administration. In Baltimore City, for example, the appointment of a health officer for the Port of Baltimore was authorized by the Legislature almost 150 years ago, on May 7, 1795. From that time to this, municipal public health administration has moved rapidly forward with efficiency and with expanding organization. Even within that setting, however, engineering administration within the health department has been sadly in arrears, although some engineering personnel has been made available within recent years.

The situation in Baltimore is perhaps typical of that prevailing in many of the municipalities of the United States.

These historical deficiencies lead one to inquire whether or not sanitary engineering work within the city health department is desirable; what those activities should encompass; and what specific functions sanitary engineers

could perform with advantage to the city health officer.

## ENGINEERING PROBLEMS OF A PUBLIC HEALTH NATURE IN A MUNICIPALITY

It is not the author's intention to rehearse at this time the comprehensive list of engineering activities which make their impact on disease and on health. Most of these are familiar to all practitioners. It is desirable, however, to recall that, within the normal American city, virtually all of the environmental problems of the past continue to confront the administrator of the present. Once more it must be emphasized, as we have pointed out many times elsewhere, that the ghosts of environmental disease have been laid only in literature but not in fact.

One of the dramatic reminders in 1940 of the eternal vigilance necessary to control environmental diseases is the recent coöperative study initiated by the States of Wisconsin, Minnesota, Illinois, Missouri, and Iowa of malaria problems in a region relatively free from this disease for over 50 years. The appearance of Mr. Le Prince in this territory as consultant in the field of mosquito eradication is an interesting example of encircling the clock of history in the environmental control field.

This phenomenon of reversion in practice is neither mysterious nor unexpected, when it is remembered that the engineer in other fields is making over the surface of the United States, by

\* Read at the Annual Conference of Municipal Public Health Engineers at Detroit, Mich., October 7, 1940.

creating structures for the impounding of water, by drainage, by relocation of rivers, and by myriads of other activities.

Other recent reminders of the problems of environmental control are in the startling typhoid fever epidemic in a state hospital in Illinois, typhus fever problems in cities in Georgia and Maryland, bubonic plague in Idaho, epidemics due to water supplies, milk and milk products, and other foods aggregating as late as 1938 over 36,000 cases.

Leslie C. Frank estimates, for example, in 1940 that "there were 1,000 or more outbreaks of disease due to faulty sanitation in 1938, resulting in hundreds of thousands of cases, and 400 or more deaths." He adds the comment that "typhus fever, with 2,300 cases and 137 deaths in 1938, undulant fever with at least 2,000 to 3,000 cases per year, and malaria with several hundred thousand cases and several thousand deaths per year, are all the result of faulty environmental sanitation."

The point need not be labored that there is much for sanitary engineers to do in the control of the environment of the highly complex municipalities of the United States and elsewhere. The regulation of factors producing malaria, yellow fever, typhus, plague, typhoid fever, and dysentery runs parallel with operations necessary for the control of schools, housing, hotels, hospitals, water supply, sewerage, and refuse disposal: with intermittent difficulty with poisoning from lead chromate in snuff and from antimony in porcelain ware. The field is broad and requires the training, the equipment and the perspective of the engineer, whether of sanitary, chemical, mechanical, or electrical origin.

If, in addition, we expand this field of activity as the author suggested in Detroit before the American Public Health Association on October 22, 1924, the practice becomes even more complex and essential. Sixteen years ago he

In all that has so far been said, the importance of environmental control for the present and the future has rested upon a narrow definition of environmental activity. I should like, for a moment, to expand upon the possibilities of the future by envisaging a physical environment delicately adjusted to the optimum physiological requirements of the individual. Heretofore, we have emphasized the control of the negative side of environment by attempting to eliminate and prevent those "accidents" of this mundane sphere to which man has been exposed, as typhoid fever, malaria, yellow fever, industrial accidents, acute infections, etc. Little or nothing has so far been contributed to the positive phase of environmental control, that is, the maintenance of a higher level of physiological efficiency at all times by the proper adjustment of the factors in environment. Obviously, our knowledge of the underlying principles of the positive effects of such adjustments of housing, ventilation and heating, upon man are exceedingly meager, but no one will question that the individual's adaptation to this world may be improved by changing the individual or by modifying his physical environment. How far this latter form of control may be extended we do not predict, but its limitations at present are in the almost complete absence of positive adjustment of environment and in the very fragmentary knowledge of the relation which the controllable physical world actually bears to physiological function. Both of these limitations time must necessarily remove, for they are limitations of inertia and ignorance.

This brief review of the technical problems of the sanitary engineer is sufficient to demonstrate the validity of the statement that a broad field of activity is at hand for the municipal public health engineer. Even a cursory familiarity, however, with the average American city and its public health organization discloses that the challenge of activity has not been met by the city health officer or his budget makers.

#### INTERNAL ADMINISTRATIVE RELATIONSHIPS

Assuming the functions exist and the job has been made available, what are the major activities and privileges of the public health engineer in the city health department?

Every municipality in the United States, almost without exception, has a staff of sanitary inspectors. For the most part they represent experienced, but generally untrained individuals. They have much to contribute to the advance of environmental control. The number of these runs from 2 or 3 in the small municipality to 400 or 500 in a city such as New York. They are an accepted fact in American municipal administration. The first function of the public health engineer is to utilize the experience of these men and to expand their possibilities by adequate in-service training to familiarize them with the most modern concepts of disease control and prevention, to reorient their activities for the maximum values in control and to adapt their experience to more fruitful performance.

So frequently the engineer is tempted to reorganize the entire sanitary inspection force, perhaps by wholesale dismissal. This approach is neither practical nor possible and often starts the enterprise off in the wrong direction. Slow addition of trained engineers to the staff will utilize and develop the potential values of the existing untrained staff to the maximum. It is perhaps the major function of the municipal public health engineer to adapt the existing staff of sanitary inspectors to maximum efficient performance.

Perhaps a second major function is to review, assay, and revise the sanitary ordinances and codes to assure a uniform, effective, and intelligent program for the control of the environment, the elimination of inadequate and obsolete regulations, the simplification and integration of existing and new rules, and the formulation of sound major policies. American cities are literally hidebound and hamstrung with ordinances and codes whose reasons for existence disappeared in the nineties. The prohibition against the use of fresh vegetables to prevent yellow fever still rests undis-

turbed in some ordinances in the United States. Now and then resurrection of the rules causes difficulty and expense.

So much of the expanding field of public health engineering requires an eye for the new, that research must supply not only the basis for control but the stimulation of new activities. The engineer accustomed to objective comparison, experiment, and observation should be a militant leader in the development of study and research undertakings. He should be in the forefront in curiosity regarding new or modified methods of prevention and control.

This does not mean that he should assist in the mere accumulation of laboratory data. Tons of laboratory reports are accumulated each year in state and municipal organizations which are for the most part useless. One of the great misfortunes of many administrative agencies is the mere collection of data which go far to the filling up of storage space, but not so far in the development of new ideas of solutions.

Every health department is the repository of a mine of statistical information of a laboratory or collateral nature. It cannot be too strongly emphasized that the engineer has a great contribution to make in the exploration of such mines. As the late Will Rogers used to say: "Collecting data is like collecting garbage. After you have it, you have to do something with it!"

#### EXTERNAL ADMINISTRATIVE RELATIONSHIPS

The public health engineer cannot fulfil his full function to the city health officer unless he is aware of the fact that engineering activities in a municipality cannot go forward in a vacuum. They must be related and integrated with all of the other physical and human activities in the city. The engineer, if he is to perform at all successfully, must perform "in vivo" and not "in vitro." He must be aware of

the fact that, if there is advantage in providing a healthy dwelling for man from birth to old age, "it must be done in a carefully planned city, with protected food supplies, safe working conditions, and protection against insects, rodents, bacteria and their ravages."

To do this intelligently and adequately means continual contact and coöperation with other public and private agencies of the city, such as the departments of planning, water, public works, buildings, finance, the council of social agencies, the housing authority, the technical schools, and virtually every other enterprise whose objective is the public health and social advancement of the city. This insistence upon the introduction of public health engineering perspectives into the complex of municipal enterprise in general will be difficult. One of the major obstacles to engineering practice within the health department lies in the hostility of other engineering agencies within the municipality. Virtually all of this opposition stems from the assumption that the engineering activities of a municipality should be within a department of public works. This is a faulty assumption, since the primary reason for an engineer in the health department is to bring to the department of public works and all other engineering agencies a health perspective generally not dominant in such departments. These engineering units have major concern with problems other than health, and it is not surprising that the health aspects of this work are sometimes underestimated, because of the pressure of manifold duties in specialized engineering fields.

cant, in contrast with the current administrative problems and duties in other fields. These examples can be multiplied many times in recent history of epidemics throughout the United States. It must be emphasized that the average engineer in municipal activity is concerned with health incidental to the major problems of construction, operation, and maintenance. The engineer in the health department, however, must have health as the predominating motive in his activity. It is primary and not secondary in his day by day administrative functioning. There is no substitute for this emphasis, small in the instance of public works departments, and great in the instance of health departments. The recognition of this variation in fact and in principle does not reflect upon either of the departments. It is a natural variation which should be recognized by every city health officer. It should be recognized, furthermore, before an epidemic and not after, as is so frequently the case.

In an increasing degree the public health engineer must relate his activity to the general physical and social problems of the city. This implies on his part not only an increasing familiarity with and an interest in the underlying physical bases of his activity, but the introduction of disease and health aspects into city planning, housing, traffic control, water supply, sewerage and other municipal functions, by frequent contact with the agencies responsible for these functions.

It is no longer a fantasy of the engineer to insist upon the significance of geography, geology, and the nature of soils as contributing elements to the causation of disease. The dust storms of the Great Plains, with the consequent increases of the silica content of the dust, have brought about an increase in fibrosis of the lungs, with physical findings bordering on silicosis. In Florida, in contrast, the severe nutritional disease

of cattle, known locally as "salt sick," occurs when feeding is restricted to native forages grown on certain white and gray sands and residual muck. In those same districts, where deficient soils were responsible for a high prevalence of "salt sick" among cattle, from 52 to 96 per cent of children examined are anemic.

One of the medical officers in this area recalls that during pregnancy Negro women living in soil deficient areas are known to walk for miles to find what is known as stump dirt—the dirt found when a large tree blows over and brings up a clay subsoil—and bring back buckets of this clay which they eat to supply the developing fetus. The need of these women for iron is great.

These illustrations are intended to indicate that the public health engineer can make his greatest contribution to external relationships by expanding his own knowledge of all of the physical features of the environment which are related to disease. He, more than any individual in the city health department, may be expected to have that academic equipment and training which should lead him not only to understand the impact of physical forces upon the individual but to apply that understanding to the problems of control. To do this with the utmost effectiveness means literally the application of all of his engineering knowledge to the problems of disease and health. To him the city health officer should look for all

of those forms of environmental regulation which by training, experience, and technic the medical officer of health cannot supply.

#### SUMMARY

The city is one of the most complex social organizations of modern times. Its survival rests upon the smooth functioning of this social organization. The health record of the city is a tribute to the efficiency of that machinery.

At the same time the risk of its collapse and disintegration is always close at hand. The city can maintain its successful position from the standpoint of health only by continuing vigilance. In this vigilance the activities of the city health department are dominant. It has been said that man treads on a thin crust of civilization. At any moment he may puncture that crust and collapse. The city health officer plays one of the most important rôles in protecting this structure. The public health engineer adds to his strength at key points.

The problems of the future are more complex still and emphasize more and more the importance of the engineer in preventing the accidents of civilization and in promoting the protections afforded by environmental control. He has an elaborate task to perform. Neither the health officer nor the engineer has taken maximum advantage of these potentialities. They are great and they await translation into actual returns.



## Need for Greater State Supervision of Water Works\*

ISADOR W. MENDELSON, C.E., F.A.P.H.A.

*Sanitary Engineer, Washington, D. C.*

**T**HOUGH we have made remarkable progress in water supply in the United States, particularly in the 1930-1940 decade, we have been unduly slow in applying increased knowledge to water works construction. This dereliction has resulted in the failure of many water works and the consequent waste of considerable financial and material resources.

In the past six years, at least 22 towns and cities in 9 states have abandoned water works projects after spending \$70,000 on them because of insufficient supply or unsatisfactory quality brought about by incomplete preliminary investigations of local water supply resources by their officials and consulting engineers. The populations of 17 of these communities averaged less than 1,000, and of the other 5 less than 1,800.

For like reasons and in the same period, one town of less than 500 population spent \$4,000 drilling a well 650' deep only to abandon it as a failure in favor of a spring supply; another town of less than 700 population spent \$3,000 on a well 650' deep and, when no water was obtained, used a river water supply; a town of 500 drilled three wells which proved dry, and then resorted to filtration of a river supply; a town of less

than 1,300 drilled 6 wells and then abandoned them after they proved dry, bought and developed an existing well and drilled another adjacent to it; another town of approximately 800 population turned from a spring development to a well; and one town of 400 turned from two wells to a spring supply.

In 1936 upon the advice of an oil geologist, a city of less than 2,000 population drilled a well 3,800' deep hoping to obtain an artesian water supply. After spending over \$96,000, and failing to get the necessary water flow, the well was abandoned as a total loss. The city officials and their adviser did not consider it necessary, before drilling a new well, to investigate thoroughly the feasibility of using an existing river supply and two nearby wells to provide the long needed improvements. In the end, the city reverted to the use of the river water.

A midwestern village of less than 500 population, seriously in need of an adequate water supply due to the low yield of existing wells, installed a new well one mile to the north of the village. During the drought years of 1930-1933, lowering of the ground water level made this supply wholly inadequate. After considerable testing, and upon the advice of the consulting engineer, a new 60' well was dug in 1934 in a valley approximately  $3\frac{1}{2}$  miles north of the village, and a pump installed. A temporary steel pipe line of old 3" boiler

flues was laid between the valley well and the one north of the village. This pipe line deteriorated rapidly and leaked excessively. In 1939 with the advice of a consulting engineer, the village drilled 30 test holes over a 5 acre tract around the valley well. The village was advised that a dependable supply of water was available beneath the valley but that the rate at which each well could be pumped was very limited due to the relatively tight character of the water-bearing strata, which gives water slowly. As one test hole near the valley well proved promising, the village decided, in order to obtain a sufficient water supply and keep pumping costs within reason, to replace the old steel pipe with 14,500' of 4" class 150 cast iron pipe and install a new well with gravel wall, pumphouse and pump. When the project was completed the yield of 4 g.p.m. from the last valley well and 6 g.p.m. from the other valley well did not suffice for the village needs.

In 1938 a city of over 100,000 population considered improvements to its ground water supply on the basis of two plans, each sponsored by different consulting engineers. The first involved an expense of approximately half a million dollars for a water softening plant and the second cost approximately \$4,000,000 for a ground water supply from 15 new wells and a surface supply to replace the present city ground water supply, a 17 mile supply line, a water softening and filtration plant, a pumping plant, and cast iron mains and storage tanks. The existing ground water supply obtained from three groups of city wells serviced by separate pumping stations was hard and slightly corrosive, resulting in tuberculation of the cast iron mains. Conical step-type aerators in use at the pumping stations proved less effective than experimental tray-type aerators in liberating carbon dioxide in the water.

Due to insufficient funds, the second

plan was abandoned and plans for the first project were initiated. Because (a) the water consumption was increasing rapidly, (b) the average rate of diminution of all the wells of the city's supply was about 3 per cent per annum and certain wells showed a decrease of 9 per cent per annum, and (c) three new wells completed in 1937 delivered less than the anticipated quantity of water, the city in 1939 changed the project to five additional city wells, cast iron mains, pumps and elevated tanks at the same cost. Three of the new wells were located within 3 miles of the main pumping station, and their yield was lowered by pumping of the station wells which influenced ground water flow in a 6 mile radius zone. There were over 150 privately owned artesian wells within this area with a capacity of over 4 times the average quantity of water distributed through city mains. These facts indicated that by 1950 the water from the existing and new wells might not be sufficient for the city's needs. The plans for the new wells provided for conical step-type aerators instead of the more efficient tray aerators. No provision was made for softening the city water.

Impartial study of these examples discloses the following significant and important findings:

1. Officials of small communities lack adequate and reliable information regarding suitable water works.
2. Existing water works practice with respect to planning and new construction seems inadequate.
3. Preliminary quantity and quality data of new water supplies are insufficient for competent determination of proper supply.

Fortunately, remedies for these imperfect conditions have been tried by governmental agencies and proved successful. What is needed is their universal application through integrated coöperating state bodies. Briefly, a suggested program would consist of:

1. Review of a new public water works proposal by the State Planning Board to determine its need, the order of importance of the project to the community with respect to other public improvements, and the timeliness of the works according to state and national economic conditions.

2. After approval by the State Planning Board, coordinate review of the proposal by (a) the state attorney general to determine compliance with the law, (b) the state comptroller or auditor to assure the adequacy of funds for construction, and (c) the state department of health to pass upon all technical phases of the plans.

3. After approval by all the reviewing state bodies, construction only of that part of the project necessary definitely to assure a water supply sufficient in quantity and suitable in quality to satisfy the municipal needs as established by the state department of health.

4. Assured of a suitable water supply, completion of the water works project subject to (a) periodical inspection by the state department of health to determine compliance with original plans and specifications, and (b) periodical audits by state auditors to assure adequate funds.

5. Before acceptance of the water works by the community, final testing and inspection by the consulting water works engineer and the state department of health to note compliance with contracts.

The plan is predicated upon assumption by state departments of health of all technical supervision over public water works. At present the majority of states have designated their health departments as agencies to review water works plans and specifications prior to construction and to supervise their operation in the interest of public health. For effective, economic, and integrated administration, it appears desirable that authority for technical supervision of construction of public water works be delegated to the same department.

It may appear amiss to raise the point that water works should be designed by licensed consulting engineers with necessary actual water works experience; yet many water works failures can be attributed to neglect of this principle. It is still not uncommon for municipal officials to depend solely on architects, geologists, and engineers experienced in other phases of engineering than water works to plan their water works systems. It is not reasonable to expect the best results with such practice.

## Second Inter-American Congress of Municipalities

A CONGRESS to bring together the urban peoples of the western world, for discussion of the rapidly increasing problems in which they have a common interest, will be held in Santiago de Chile, September 15 to 21, 1941.

The first Pan-American Congress of Municipalities assembled in Havana in November, 1938, and was organized in accordance with a resolution adopted by the 6th International Conference of

American States which met in Havana in 1928. A Secretariat in Havana has been collaborating with various American countries and has published the *Bulletin of the Pan-American Commission on Inter-Municipal Coöperation*.

Among the Commissions for the consideration of technical municipal problems is a section on Urban Planning for the Municipality, including health, transit and safety, and other technical considerations.

# Disabling Sickness Among Industrial Workers

With Particular Reference to Time Changes in Duration\*

WILLIAM M. GAFAFER, D.Sc., F.A.P.H.A.

Senior Statistician, U. S. Public Health Service, Washington, D. C.

DURING recent years several sickness experiences among industrial workers have revealed an increasing average duration of incapacitation, a discovery which is seriously engaging the attention of many who are interested in the protection and improvement of the health of the worker. Thus the Department of Health for Scotland is devoting more and more thought to the subject as is evidenced by the increasing amount of material on chronic incapacitation† that has appeared in the last three annual reports on incapacitating sickness in the insured wage earning population of Scotland. Reference is made to the reports covering 1934-1935, 1935-1936, and 1936-1937 which were published in 1936, 1937, and 1939, respectively.<sup>11, 12, 13</sup>

Of these reports the first devotes a short paragraph to the subject emphasizing that a large part of the whole sickness loss is contributed by long-term incapacities, the rates for these showing over a 5 year period a tendency to increase. The second report contains a "Special Study—Chronic Incapacity," stating, among other things, that of the

total 19.75 million days of incapacitation for 1935-1936, 11 million days were accounted for by chronic illness. Finally the third report carries a complete section on the subject. In a review of this report the *Lancet* comments editorially as follows: "The prevalence of chronic incapacitating sickness is one of the most formidable of the problems that now confront health insurance administrators."<sup>14</sup>

These long-term sicknesses have contributed much to the average annual time-lost rate, and it is of interest to observe that an examination of the appropriate data given in the different annual reports reveals that the trend of this rate is upward for the insured male population of Scotland.

Because of the important implications of these findings the present paper briefly reviews the Scotch experience, and examines the morbidity experience of a sample of white male American industrial workers with particular reference to time changes in the average duration of incapacitation.

## EXPERIENCE AMONG THE INSURED POPULATION OF SCOTLAND\*

The most recent annual report<sup>15</sup> deals with the incapacitating sickness experience of about 1.8 million wage

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940. In connection with this paper the reader is referred to item 10 in the list of references.

† *Chronic incapacitation*, that is, incapacitation accounted for by "cases current over the entire statistical year."

\* In this connection the reader is referred to items 15 and 16 in the list of references.

earners for the year 1936-1937 and records 26.7 million days of sickness of which 42 per cent were accounted for by long-term illnesses. Of the 20,000 chronic cases surviving at June 30, 1937, among 1.2 million males, 4,000 had their onset in 1935; 3,000 in 1934; 2,400 in 1933; 2,000 in 1932; 2,000 in 1931; 1,000 in 1930; between 100 and 800 in each of the years 1918-1929, and less than 100 in each of the years, 1912-1917. Thirteen per cent were among males under 35 years of age; 46 per cent between 35 and 55; and 41 per cent over 55 years of age. An examination of age at onset shows, according to the report, that the number of persons incapacitated at a given date contains a much larger proportion of comparatively young persons than might have been anticipated.

With regard to cause, in males under 35 years of age, tuberculosis and "other diseases of the nervous system" (principally mental cases in institutions) account for half of the total cases; in the age group 35-55, over half of the total incidence is accounted for by diseases of the nervous system (21 per cent), tuberculosis (11 per cent), bronchitis and pneumonia (10 per cent), and rheumatism (9 per cent); and, finally, in ages over 55 years, 5 cause groups accounted for nearly two-thirds of all cases: "other diseases of the nervous system" (15 per cent), rheumatism (14 per cent), heart disease (12 per cent), nervous debilities (11 per cent), and bronchitis and pneumonia (10 per cent).

With respect to time changes in the average annual number of days of incapacity from all causes, the available data cover the 6 years, 1931-1937, and show an increase from 8.3 days per male at the beginning of the period to 14.1 days at the end. An upward trend is observable for each of the quinquennial age groups. The quinquennial rates for 1931-1932 vary from 4.3 at

under 20, to 32.0 at 60 and over, while the corresponding variation for 1936-1937 is 5.5 to 49.2. The rates for the quinquennia between 35 and 60 in 1936-1937 are approximately double the corresponding rates for 1931-1932.

In an attempt to account for the unfavorable trend of chronic disability among the insured population of Scotland, McKinlay<sup>17</sup> refers to two factors: first, the aging of the population, and, second, the decline in mortality. The aging of the population, according to this author, when viewed in relation to the ages under consideration, offers only a small part of the explanation. With respect to the decline in mortality, he writes: "It is possible, indeed probable, that part of the increase is directly attributable to the saving or prolongation of life, death being postponed, but working capacity not necessarily restored. . . ."

## PRESENT EXPERIENCE

### *I. Introductory*

*Source of data*—The Occupational Morbidity and Mortality Study\* makes available the data requisite for the present inquiry. These data comprise certain selections from the material transcribed from the medical records of the sick benefit organization of a railroad, and cover the years 1930 through 1934.

*Regulations of the sick benefit organization* — The transcribed sickness data are by no means complete because of certain regulations governing the sick benefit organization. Only those disabilities were included for which sick benefits had been paid, and these disabilities had to be longer than the waiting period of 6 days. Moreover, the introduction of a standard 7 day wait-

\* A part of the National Health Survey, a survey made possible by a grant from the Works Progress Administration in 1935. Papers that have appeared thus far from the Occupational Morbidity and Mortality Study are given in the list of references; the reader is referred particularly to numbers 2 and 3.

ing period at the beginning of the analyses based on the material from the Occupational Morbidity and Mortality Study affects the present experience in that it was necessary to omit all recorded disabilities of 7 days' duration.

Furthermore, accidents of industrial origin are not included in the records, and generally the records are not inclusive of all disabling illnesses and nonindustrial injuries of the duration specified above, since the organization refuses sick benefits for disability resulting from the improper use of stimulants or narcotics, "immoral practices," voluntary self-injury, unlawful acts, and fighting.

While membership was voluntary in the organization, and none was debarred because of chronic ailments or because of employment in a particular occupation, there was specified for employees desiring membership an age limit of 45 years, as well as the passing of a physical examination.

The benefit period is 52 weeks, with half benefits continuous thereafter; the maximum is 52 weeks per year, with half benefits continuous thereafter. Successive periods of disability from the same cause are summed in computing the 52 weeks of full-rate benefits; if at work for 13 full weeks, the case is considered a new one, and the member is eligible for 52 full weeks again, otherwise half benefits are received.

*Notification, certification, and verification of disability*—The organization requires that a case be reported immediately, a physician's certificate of illness is necessary, and the nature of the illness is reported by the physician. Company physicians are responsible for detecting malingering.

*Medical provisions* — The railroad provides medical examiners, clinic treatments, and consultant and first aid work by nurses and first aid men. Provisions are made for the medical ex-

amination of trainmen and track workers every 2 years to age 40, and every year thereafter. Special examinations are made more frequently when necessary. A regular health bulletin and program are maintained.

## II. Analysis of the Data

It is helpful to remember in connection with the analysis that the three rates (average duration of incapacitation, time lost, and frequency) are related and that because of this relationship any one of the rates may be obtained from the other two. Thus if A, B, and C are defined as follows,

A = average annual number of days of disability per person or time-lost rate or disability rate

B = average annual number of cases of disability per 1,000 persons or frequency rate

C = average number of days per case or average duration of incapacitation or disability

then,  $A = BC/1,000$ ,  
 $B = 1,000 A/C$ , and,  
 $C = 1,000 A/B$ .

*Population, cases, and days of disability*—A total of 27,562 white male railroad workers constitutes the exposed population. On the basis of continuous membership in the sick benefit organization during the entire study period of 5 years, this population would have yielded 137,810 male-years of exposure. Actually there were 105,753 male-years, indicating that the average membership per male was approximately 46 instead of 60 months. There were 15,372 cases of disability that lasted 8 calendar days or longer; these cases accounted for 1,985,183 days of disability.\* For all ages the average daily percentage of males disabled during the 5 years was 5.1. This percentage was 1.5 at under 25 years of

\* These days of disability include the first 7 days of disability.

TABLE 1

*Average Annual Number of Days of Disability per Male on Account of Sickness and Nonindustrial Injuries from Cases Lasting 8 Calendar Days or Longer, by Age Group and Year of Onset of Disability; Experience of White Male Members of the Sick Benefit Organization of a Railroad, 1930-1934, Inclusive*

Year of Onset of Disability	Age in Years as of July 1, 1932						
	All Ages <sup>1</sup>	Under 25	25-34	35-44	45-54	55-64	65 and Over
	<i>Number of Days of Disability per Male</i>						
1930-1934	18.8	5.6	8.6	12.5	19.5	37.6	59.6
1930	13.9	3.4	6.9	9.4	14.8	28.2	60.2
1931	16.4	5.7	7.6	10.9	17.5	32.4	53.7
1932	20.1	6.8	9.7	14.3	21.0	36.8	65.1
1933	22.3	10.3	10.9	14.3	21.7	43.7	66.7
1934	23.1	6.2	9.6	14.4	23.7	49.6	52.2
	<i>Number of Days of Disability</i>						
1930-1934	1,985,183	11,506	164,080	411,888	612,037	712,317	69,794
1930	348,077	2,453	36,861	70,830	101,427	116,672	19,331
1931	369,580	2,649	32,492	76,016	114,962	128,774	13,968
1932	416,288 <sup>†</sup>	2,191	34,333	93,290	131,211	139,683	14,462
1933	417,442	2,337	30,554	85,303	128,687	156,755	13,000
1934	433,796	1,876	29,840	86,449	135,750	170,433	9,033
	<i>Number of Male-years of Membership</i>						
1930-1934	105,753	2,040	19,054	33,072	31,322	18,927	1,171
1930	24,989	730	5,324	7,569	6,860	4,138	321
1931	22,566	461	4,279	7,002	6,554	3,974	260
1932	20,676	320	3,541	6,520	6,252	3,793	222
1933	18,739	228	2,803	5,981	5,919	3,589	195
1934	18,783	301	3,107	6,000	5,737	3,433	173

<sup>1</sup> Includes a negligible number of persons of unknown age.

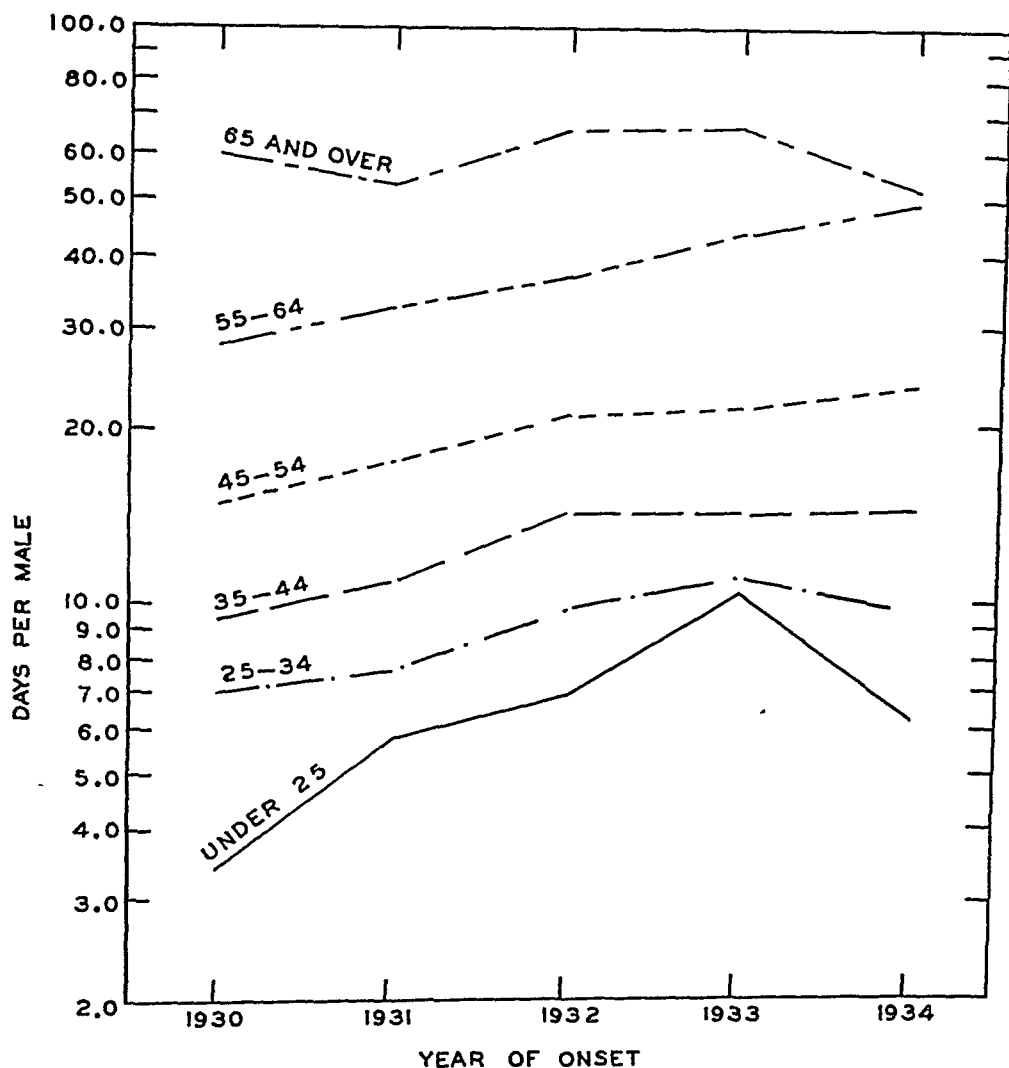
age, and increased gradually to 16.3 per cent at 65 and over.<sup>†</sup>

*Average annual number of days of disability per male by age group and year of onset of disability*—The pertinent rates specific for age group and year of onset of disability are shown in Table 1. It will be observed that the rates for the 5 years, 1930-1934, increase in an orderly manner from 5.6 days per male per year for ages under 25 years to 59.6 for ages 65 and over. There is a similar movement with age, though not so orderly, when the years of onset of disability are considered separately.

<sup>†</sup> These rates for the 5 years as well as those for each year may be obtained from Table 1 by dividing the appropriate average annual numbers of days of disability per male by 3.65. With regard to the time changes in the rates, Figure 1 may be conveniently used to represent them. All that is necessary is to reduce each unit of the vertical scale by dividing by 3.65, the curves themselves remaining unchanged. No account is taken of the negligible error introduced by the fact that the year 1932 contained 366 days.

The foregoing is another confirmation of what has been repeatedly found, namely, that the time-lost rate increases with age. What is perhaps of more importance for the present inquiry are the time changes in the rate, particularly the time changes specific for age group. Table 1 contains the requisite material for a consideration of these changes, and Figure 1 shows them graphically. An inspection of the table reveals that the rate for all ages increases gradually from 13.9 days per male in 1930 to 23.1 in 1934, the magnitudes of the rate and consequently their movement being remarkably similar to the experience of the age group, 45-54 years. The figure shows that the trend of the rates corresponding to each age group increased gradually with the passage of time, the trend for the age group 55-64 years showing the most rapid increase. It is also observed that the rates for each age group form discrete sets, the graph for each succeeding

FIGURE 1—Average annual number of days of disability per male on account of sickness and nonindustrial injuries from cases lasting 8 calendar days or longer, by age group and year of onset of disability; experience of white male members of the sick benefit organization of a railroad, 1930-1934, inclusive. (Vertical logarithmic scale.) The graph representing "all ages" is not shown; it follows closely the graph for ages 45-54 years.



older age group appearing in a higher position than its predecessor. The more or less erratic behavior of the rates corresponding to the youngest and oldest age groups may be ascribed to the relatively small numbers of workers comprising those age groups.

*Average annual number of disabilities per 1,000 males by age group and year of onset of disability*—In the preceding section it was shown that during the years, 1930-1934, each age

group of the white male railroad workers under study experienced time-lost rates whose trend was upward. It is of considerable interest to know how the frequency of the cases behaved with respect to the same time period. Table 2 shows the average annual number of cases per 1,000 males by age group and year of onset of disability, and Figure 2 presents the material graphically. It will be seen that while for each age group the rates for successive years are



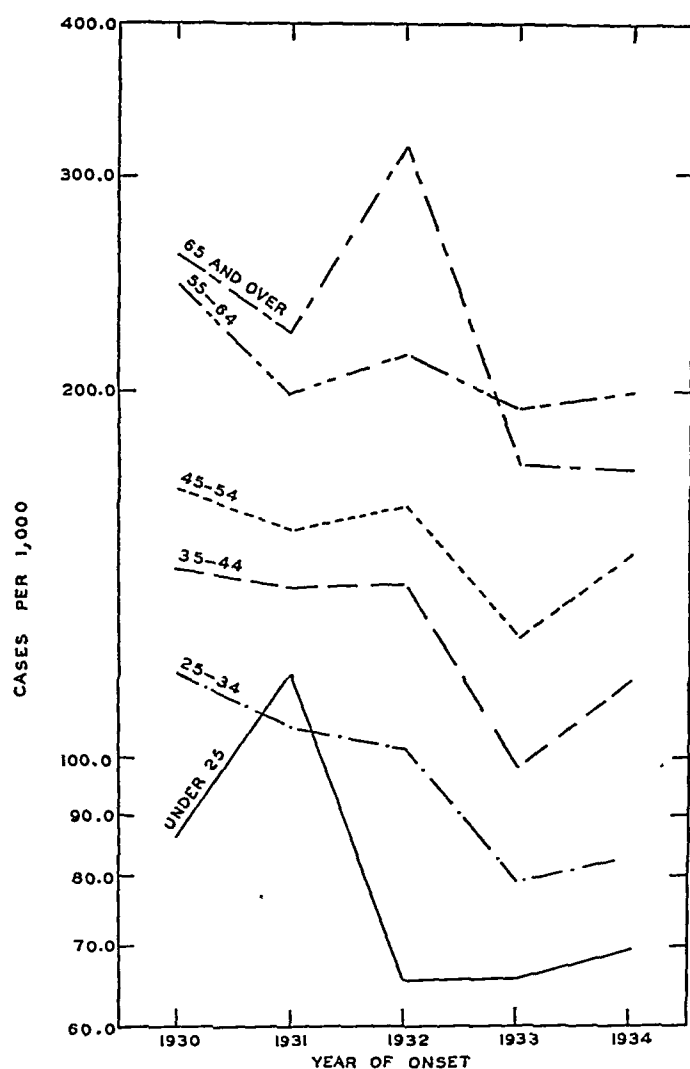


FIGURE 2—Average annual number of cases of disability per 1,000 males on account of sickness and nonindustrial injuries, cases lasting 8 calendar days or longer, by age group and year of onset of disability; experience of white male members of the sick benefit organization of a railroad, 1930-1934, inclusive. (Vertical logarithmic scale). The graph representing "all ages" is not shown; it follows closely the graph for ages 45-54 years.

TABLE 2

*Average Annual Number of Cases of Disability per 1,000 Males on Account of Sickness and Nonindustrial Injuries, Cases Lasting 8 Calendar Days or Longer, by Age Group and Year of Onset of Disability; Experience of White Male Members of the Sick Benefit Organization of a Railroad, 1930-1934, Inclusive*

Year of Onset of Disability	Age in Years as of July 1, 1932						
	All Ages <sup>1</sup>	Under 25	25-34	35-44	45-54	55-64	65 and Over
<i>Number of Cases per 1,000 Males<sup>2</sup></i>							
1930-1934	145.4	85.3	100.8	128.2	152.0	210.2	234.8
1930	160.7	86.3	117.4	142.7	166.9	244.8	258.6
1931	148.1	117.1	106.1	138.1	154.7	198.3	223.1
1932	153.3	65.6	102.2	139.1	161.1	210.4	315.3
1933	123.0	65.8	79.2	98.6	126.4	193.4	174.4
1934	135.3	69.8	83.0	116.2	147.6	199.8	173.4
<i>Number of Cases of Disability</i>							
1930-1934	15,372	174	1,921	4,241	4,761	3,979	275
1930	4,016	63	623	1,080	1,145	1,013	83
1931	3,341	54	454	967	1,014	788	58
1932	3,169	21	362	907	1,007	798	70
1933	2,305	15	222	590	748	694	34
1934	2,541	21	258	697	847	686	30

<sup>1</sup> Includes a negligible number of persons of unknown age.

<sup>2</sup> For the number of male-years of membership, see Table 1.

not always less than the corresponding rates for years immediately preceding, the time trends of the rates are generally downward. This downward trend in frequency is in harmony with a finding which appeared in a recent paper<sup>18</sup> based on industrial morbidity records covering 18 years. Thus while the time-lost rates followed an upward trend, the frequency rates described a downward one. This is sufficient evidence to enable one to predict an upward trend in the average duration of disability, a prediction which will be found confirmed in the section on average duration which is to follow.

Attention is directed in passing to the upward trend in frequency with respect to age. This trend may be seen in Table 2 by inspection and appears to be upward for each of the 5 years; the upward movement may also be seen in Figure 2 by reading vertically instead of horizontally.

*Average duration of disability by age group and year of onset of disability*—The disability and frequency rates have been examined, and reference was made to the partial dependence of each on the average duration of disability. Since the present paper is concerned primarily with the behavior of the duration of disability Table 3 and Figure 3 are appropriately presented.

An inspection of Table 3 discloses that the age trend of the rates is upward for the period 1930–1934, and for each year, the ratio of the rate for ages 65 and over to that for under 25 years varying from approximately 2 for the year 1932 to 6 for the year 1930. It will also be observed that the age changes of the rates according to year of onset of disability are such that make impossible the ordering of the years. Thus, while 1932 shows the lowest rate for the age group 65 and over, 1930 shows the lowest rate for the group under 25 years; and while 1933 shows the highest rate for both 65 and over and under 25, 1934 shows the highest rate for the age group 55–64 years. It is of interest also to observe that for each of the 5 years, 1930–1934, the rates yielded by the age groups 55–64, and 65 and over, are greater than the rate for all ages for the corresponding year.

Figure 3 shows graphically the movement of the rates with the passage of time for each of the 6 age groups. It will be observed that the rates for each age group follow an upward trend. When the age group under 25 years is disregarded it is seen that the graphs representing the time changes of the rates of the remaining 5 age groups appear in order of increasing age. With re-

TABLE 3

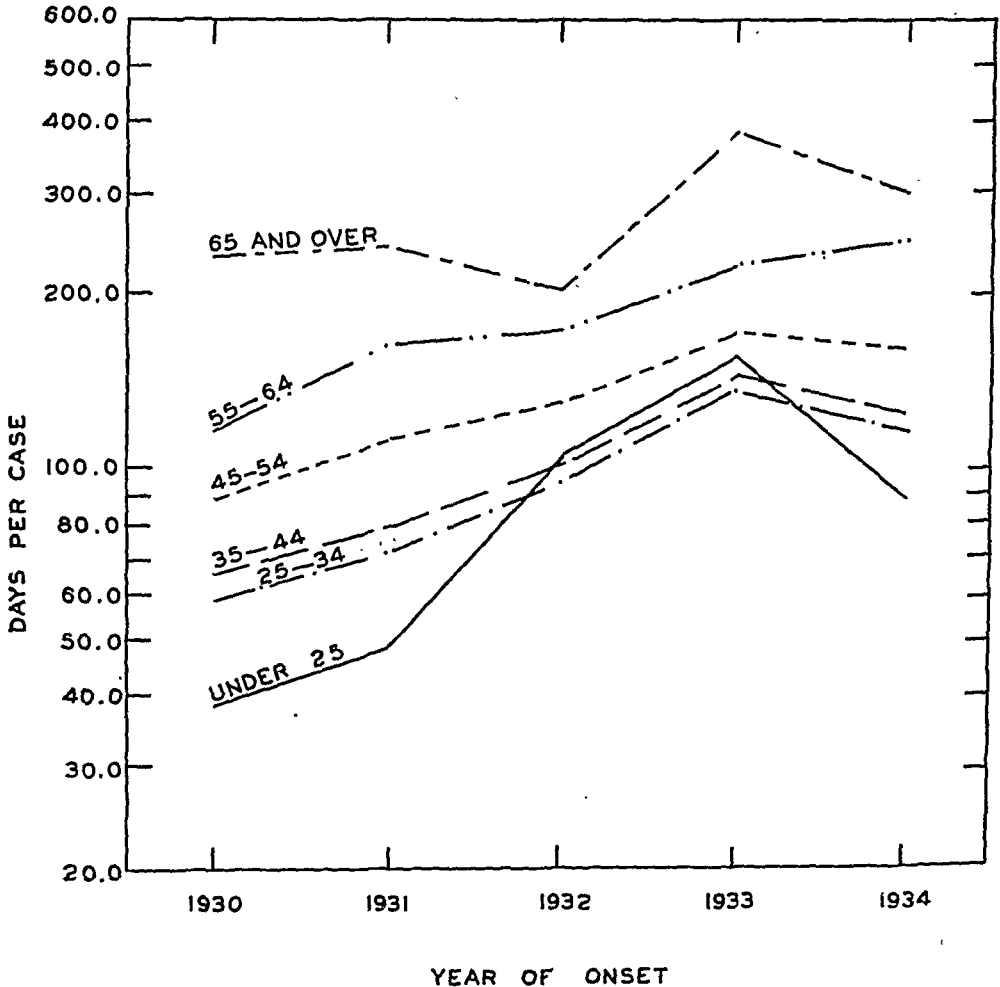
*Average Duration of Cases of Disability on Account of Sickness and Nonindustrial Injuries, Cases Lasting 8 Calendar Days or Longer, by Age Group and Year of Onset of Disability; Experience of White Male Members of the Sick Benefit Organization of a Railroad, 1930–1934, Inclusive*<sup>1</sup>

Year of Onset of Disability	Age in Years as of July 1, 1932						
	All Ages <sup>2</sup>	Under 25	25–34	35–44	45–54	55–64	65 and Over
1930–1934	129.1	66.1	85.4	97.1	128.6	179.0	253.8
1930	86.7	38.9	59.0	65.6	88.6	115.2	232.9
1931	110.6	49.1	71.6	78.6	113.4	163.4	240.8
1932	131.4	104.3	94.8	102.9	130.3	175.0	206.6
1933	181.1	155.8	137.6	144.6	172.0	225.9	382.4
1934	170.7	89.3	115.7	124.0	160.3	248.4	301.1

<sup>1</sup> For the number of days of disability and the number of cases entering the calculation of the rates, see Tables 1 and 2, respectively.

<sup>2</sup> Includes a negligible number of persons of unknown age.

FIGURE 3—Average duration of cases of disability on account of sickness and non-industrial injuries, cases lasting 8 calendar days or longer, by age group and year of onset of disability; experience of white male members of the sick benefit organization of a railroad, 1930-1934, inclusive. (Vertical logarithmic scale.) The graph representing "all ages" is not shown; it follows closely the graph for ages 45-54.



spect to the rapidity of increase in the time trends it will be observed that when the youngest and the oldest age groups are disregarded the rate of increase is approximately the same for each of the remaining 4 age groups; thus while the trends describe different paths, their rate of increase is approximately the same.

Finally, it must be pointed out that the present morbidity experience offers an excellent example of the inadequacy of the frequency rate as a possible

measure of economic losses from sickness and injuries. Thus, while the average annual frequency of disabilities followed a declining trend with time, the average duration of the disabilities showed an upward trend.

#### SUMMARY

According to published official reports the problem of chronic incapacitation is becoming of increasing importance among the insured wage earning population of Scotland.

Among a group of approximately 30,000 white male American industrial workers it was found that while the average frequency of 8 day or longer disabilities followed a downward trend during the years, 1930-1934, the average duration of the disabilities moved upward.

Evidence is presented to show that, as a measure of economic losses from sickness and injuries, the average frequency rate may lead to erroneous conclusions, since this rate may decline while at the same time the average duration of disability may increase.

#### REFERENCES

##### *Papers from the Occupational Morbidity and Mortality Study*

1. Sayers, R. R., DallaValle, J. M., and Bloomfield, S. G. Occupational and Environmental Analysis of the Cement, Clay, and Pottery Industries. *Pub. Health Bull. No. 238*. Government Printing Office, Washington, D. C., 1937.
2. Sayers, R. R., Kroeger, G., and Gafafer, W. M. General Aspects and Functions of the Sick Benefit Organization. *Pub. Health Rep.*, 52:1563-1580 (Nov. 5), 1937. (Reprint No. 1874.)
3. Gafafer, W. M. Frequency of Sickness and Nonindustrial Accidents Causing Disability Lasting Eight Calendar Days or Longer among 60,000 White Male Railroad Employees, 1930-34, inclusive. *Pub. Health Rep.*, 53:555-573 (Apr. 15), 1938. (Reprint No. 1924.)
4. Brinton, H. P. Disabling Sickness and Non-industrial Injuries among Drivers and Other Employees of Certain Bus and Cab Companies, 1930-34, inclusive. *Pub. Health Rep.*, 54:459-468 (Mar. 24), 1939. (Reprint No. 2049.)
5. Brinton, H. P., and Seifert, H. E. Disabling Morbidity among Employees in the Soap Industry, 1930-34, inclusive. *Pub. Health Rep.*, 54:1301-1316 (July 21), 1939. (Reprint No. 2093.)

6. Seifert, H. E. The Coding of Occupations for Machine Tabulating Purposes with Reference Principally to Studies on Occupational Morbidity. *J. Indust. Hyg.*, 21:246-255 (Sept.), 1939.

7. Brinton, H. P. Disabling Morbidity, and Mortality among White and Negro Male Employees in the Slaughter and Meat Packing Industry, 1930-34, inclusive. *Pub. Health Rep.*, 54:1965-1977 (Nov. 3), 1939. (Reprint No. 2111.)

8. Brinton, H. P., Seifert, H. E., and Frasier, E. S. Disabling Morbidity among Employees in the Slaughter and Meat Packing Industry, 1930-34, inclusive. *Pub. Health Rep.*, 54:2196-2219 (Dec. 15), 1939. (Reprint No. 2119.)

9. Brinton, H. P., and Frasier, E. S. Disabling Morbidity among Male and Female Employees in Mail Order Stores, 1930-34, inclusive. *Pub. Health Rep.*, 55:1163-1178 (June 28), 1940.

10. Gafafer, W. M. Disabling Sickness among 2,000 White Male Glass Workers. *Pub. Health Rep.*, in press.

##### *Other References*

11. Department of Health for Scotland. [Fifth] *Report on Incapacitating Sickness in the Insured Population of Scotland during the Year 1st July 1934 to 30th June 1935*. His Majesty's Stationery Office, Edinburgh, 1936.
12. ———. Sixth Report. 1st July 1935 to 30th June 1936. His Majesty's Stationery Office, Edinburgh, 1937.
13. ———. Seventh Report. 1st July 1936 to 30th June 1937. His Majesty's Stationery Office, Edinburgh, 1939.
14. Incapacitating Sickness in Scotland. *Lancet*, 1:351 (Feb. 11), 1939.
15. Department of Health for Scotland. *Report, Committee on Scottish Health Services*. His Majesty's Stationery Office, Edinburgh, 1936.
16. Foster, W. J., and Taylor, F. G. *National Health Insurance*. 3rd ed. Sir Isaac Pitman and Sons, Ltd., London, 1937.
17. McKinlay, P. L. Discussion on Incapacitating Sickness. First Paper. *J. Roy. San. Inst.*, 58:374-380 (Dec.), 1937.
18. Gafafer, W. M. The Course of Disabling Morbidity among Industrial Workers, 1921-38. *Pub. Health Rep.*, 55:962-974 (May 31), 1940. With minor changes in: *Indust. Med.*, 9:55-61 (Feb.), 1940.
19. Boas, E. P. *The Unseen Plague—Chronic Disease*. J. J. Augustin, New York, 1940.

## DISCUSSION

RICHARD D. MUDD, M.D., PH.D.

*Medical Director, Chevrolet-Grey Iron Foundry and Chevrolet-Transmission, Saginaw, Mich.*

IT is a privilege to discuss Dr. Gafafer's paper on the question of absenteeism in industry, not only because this problem in industrial health has proved to be one of the most important but also because Dr. Gafafer has been a pioneer in this important field.

Anyone who reads his writings or listens to his discussions on the subject cannot help but be impressed with his exactness and the care with which he presents the problem.

We have known that the problem of absenteeism in industry was a big and

an important one, and we realized that the relationships of many of its factors needed to be studied. We further realized that it is a great drain on industrial production for employees to be disabled an average of 10 days each year. However, the conclusions that Dr. Gafafer has drawn from his present paper have an importance far beyond the significance of the average 10 day loss which has been shown to occur in industry. I would like to call your attention to two trends in industry that may be significant in this increase in absenteeism in industry that Dr. Gafafer has concluded is occurring. The first factor which he has already mentioned generally is the increasing age of employees. This increase in the average age is due in great part to the increased emphasis being placed on seniority. With the seniority provisions existing in most industries employees are remaining on their jobs until they are much older, and because of lowered mortality, particularly in youth, more persons are living to the older ages. If then the older employee is progressively losing more time as Dr. Gafafer suggests, it is evident that absenteeism will

increase, and we do not know yet what the ceiling will be. A second factor which must be seriously considered is the effect of military conscription, because this will mean the removal from industry of many of the younger group of men, thereby leaving a still larger percentage of older employees. Accordingly we should experience an increase in total days of disability during the years military conscription is in effect. This matter should receive a great deal of consideration because at this time every hour of available work is so important for the production of materials necessary for national defense. Furthermore, there is no reason to believe that an individual will cease to be disabled when he enters the military service. In fact there is every reason to believe that the frequency and average duration of disability will continue if it does not actually increase. Therefore it would be interesting if absenteeism in the military service could be studied in the same way as it is being studied under Dr. Gafafer's supervision so that proper comparisons could be made.

To explain this relationship of age and absenteeism a little better, I in-

TABLE 1  
*Employee Disabilities According to Duration of Disability and Age of Employees Beginning During the Period January 1 to June 30, 1939*

Duration of Disability	Ages of Disabled Employees						Total	Per cent
	Less than 21 Yrs.	21 to 30 Yrs.	31 to 40 Yrs.	41 to 50 Yrs.	51 to 60 Yrs.	61 and Over		
3 to 7 days	0	84	153	89	38	9	373	52.8
8 to 13 days	0	17	44	23	13	2	99	14.0
14 to 60 days	0	47	70	49	13	5	184	26.0
60 to 98 days	0	6	11	15	7	3	42	6.0
Over 98 days	0	2	3	3	1	0	9	1.2
Total		156	281	179	72	19	707	100.0
Per cent		22.0	39.8	25.3	10.2	2.7	100.0	....
Per cent of employees in each age group	1.1	25.15	39.86	23.90	8.28	1.70	....	....
Number of long term absences over 13 days	0	55	84	67	21	8	235	....
Per cent of long term absences by age group	0	23.4	35.8	28.5	8.9	3.4	100.0	....

NOTES: 1. Disabilities and (or) absences of less than 3 days not computed.

2. This age distribution is based on 4,568 insured employees, representing about 98 per cent of the employees.

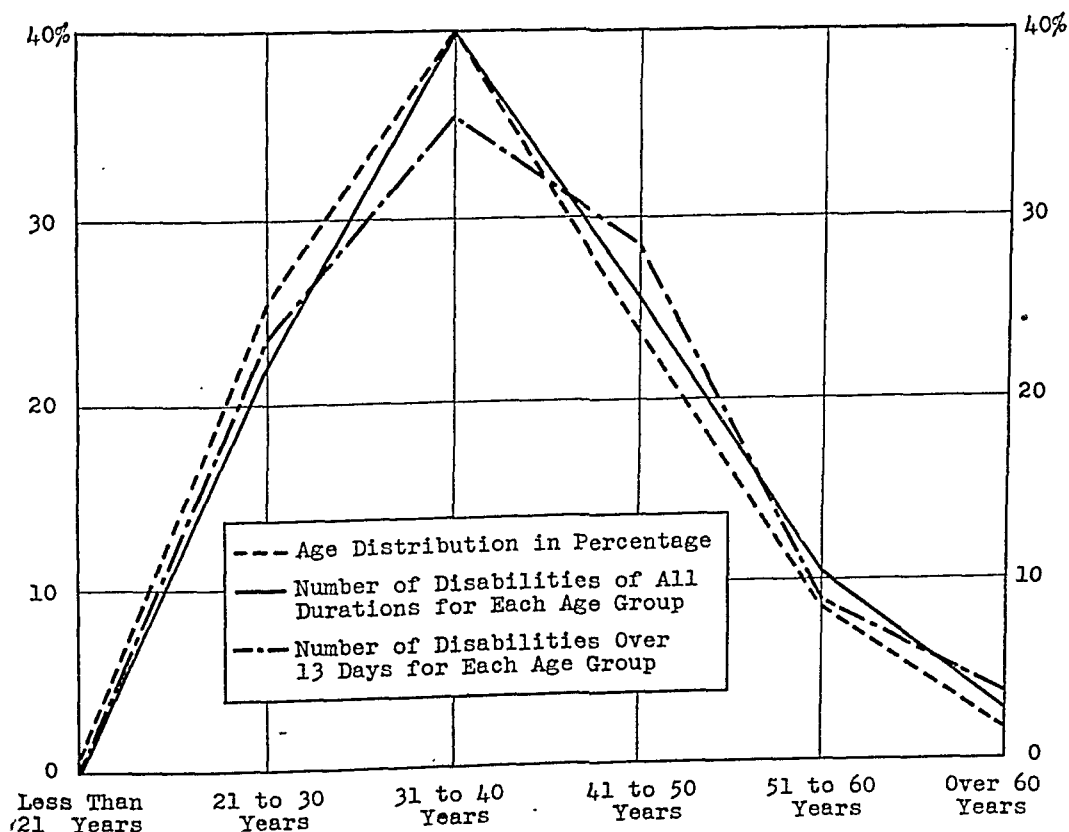
spected the records of the 707 consecutive disabilities of 3 days or more beginning during the period January 1 to June 30, 1939. The results are shown on Table 1. You will note that for the age period 21 to 30, the rate for disabilities of all durations was slightly (12.5 per cent) less than the age distribution. For the age group 31 to 40 it was identical with the age distribution; for the age group 41 to 50 it was 5.5 per cent in excess of the age distribution; for the age 51 to 60 18.8 per cent in excess; and for those over 60 it was 37.1 per cent in excess of the age distribution.

When the longer disabilities, *i.e.*, those over 13 days were used as a comparison, similar results were obtained.

The percentage of disabilities was less than the percentage of employees up to age 40 inclusive. For the age group 41 to 50 the disabilities were 19.2 per cent above the age distribution; for 51 to 60 years this excess was 6.4 per cent; and for those over 60 years the excess was 100 per cent. However, it is very important to explain that it is not safe to draw any definite conclusions from 707 disabilities, nor from 4,400 employees. The number of disabilities and the size of the employed group is too small to warrant conclusions over any 6 month period of experience. It does however agree with Dr. Gafafer's findings. This relation of age and disability rate is better shown by a graphic scale shown on Figure 1.

FIGURE 1

RELATIONSHIP OF DISABILITY FREQUENCY TO AGE FOR 707 CONSECUTIVE DISABILITIES OF 3 DAYS OR MORE FROM JANUARY 1, TO JUNE 30, 1940



You will note that the disability rate curves are at a lower level for the age periods prior to age 41, and that thereafter the rate curves are uniformly at a higher level than the age curve.

Dr. Gafafer has shown that disability frequency can decrease, and at the same time the average duration can increase. I thought it would throw some additional light on this subject to show you the statistics of the Chevrolet-Grey Iron Foundry for 1940 (to August 23) concerning the relation of frequency of disabilities and total days disabled.

is absent 140 days, only one employee replacement is necessary. The replacement cost to industry is small and there is a minimal interference with the flow of production. However, if 10 employees lose 2 days each, 10 replacements, however temporary, are necessary, and yet only one-seventh as many days are lost as compared with the long disability. I realize that in the first case there may be a drain on the welfare department to support the disabled individual and his family, but if you think of the community, frequency is important for another reason. If an

TABLE 2

*Number of Absences and Days Disabled of Employees According to Length of Disability For the Period January 1 to August 23, 1940*

Length of Absence or Disability	Absences				Days Disabled			
	No. of Absences	Per cent of the Total	Absences Cumulative	Per cent Cumulative	Days Lost	Per cent of the Total	Days Lost Cumulative	Per cent Cumulative
Less than one day	125	4.3	125	4.3	68	0.4	68	0.4
1 day and less than 2	1,424	49.1	1,549	53.4	1,413	8.7	1,481	9.1
2 days and less than 3	506	17.7	2,055	71.1	1,014	6.2	2,495	15.3
3 days and less than 4	171	5.9	2,226	77.0	511	3.3	3,006	18.6
4 to 7 days inclusive	280	9.5	2,506	86.5	1,022	6.3	4,028	24.9
8 to 13 days inclusive	126	4.3	2,632	90.8	1,293	8.0	5,321	32.9
14 to 30 days inclusive	127	4.3	2,759	95.1	2,575	15.9	7,896	48.8
31 to 60 days inclusive	101	3.5	2,860	98.6	4,687	28.9	12,583	77.7
61 to 97 days inclusive	29	1.0	2,889	99.6	2,147	13.3	14,730	91.0
98 days and over	12	0.4	2,901	100.0	1,458	9.0	16,188	100.0

You will see the importance of keeping short term disabilities because in our experience for the period under consideration, 86.5 per cent of the disabilities had occurred prior to the 8th day of disability. However, these 86.5 per cent of disabilities represented but 24.9 per cent of the total days lost, and therefore it is evident that there can be a tremendous decrease in frequency without materially affecting total days lost as Dr. Gafafer found. One might conclude therefore that it was not so important to record frequency of disability. Such, however, is not true. It is not possible to determine the "average duration of disability" unless the frequency is available as Dr. Gafafer has shown. But frequency has a greater significance. If an employee

employee has one cold a year and it disables him 10 days, he exposes his family and fellow workers over one period. If he has 5 colds and they disable him 2 days each he is exposing his contacts 5 times, and the vicious circle of infection is thereby magnified. Also it would seem to be a basic fact that if we are to control the longer disabilities we should have a thorough understanding of the distribution of and rate changes in the short disabilities.

There are so many factors concerned in the question of absenteeism that I thought it would be worth while to list the more important ones. They are as follows:

1. Diagnosis and by whom made
2. Industry
3. Occupation

4. Length of disability in calendar days
5. Number of work days lost
6. Age and race of absentees
7. Length of employment in occupation; hours of work per day, per week and per year
8. Shift on which the employee works
9. Season of the year
10. Recurrence of disabilities due to the same or different causes
11. Insurance or benefit plans
12. Amount of checking of absentees

A paper could be presented on any one of these factors, and therefore we do not have the time to consider them in detail. However, it is important to explain that, as a rule, several of these factors can be and usually are considered in relation to each other. Dr. Gafafer's paper concerns the relation of age (No. 6) and length of disability (No. 4). The fact that any of these factors may be considered in relation to any one or more of the others speaks for the complexity and confusion of this important matter.

Furthermore, I should explain that the discussion of the relationship of age and disabilities is not definitely in line with Dr. Gafafer's paper. His paper pertains to the *changes* in duration of disabilities and attempts to show that while the frequency of 8 day or longer disabilities followed a downward trend for the years covered, the average duration of disabilities moved upward. To arrive at such a conclusion it is necessary, (1) to have a sufficient number of employees under consideration, (2) to keep records in the same way for a number of years, (3) to submit the statistics to identical studies for each year.

Because it is necessary to have a very large group of employees under observation over a long period of time and in a standard fashion, it is important that this work be under a central bureau or department to which coöperating industries will report. The local health departments should be trained to do this work, and their results could be

FIGURE 2

## ABSENCE CARD

Clock No.	
Name	
TIME DEPT. ITEMS	Soc. Sec. No.
	Occupation
	Occ. Code No
	Off From To
	Work Days Lost
FILLED IN BY FOREMAN	Requisition by Foreman
	Department
	For job of
	Requiring Light — Medium — Heavy Work —
	Standing or Sitting
EMPL. DEPT.	O K. for Clock card
	Request for Phys. Exam.
MEDICAL DEPT. ITEMS	Pass Home PNTW ANTW
	PFW By
	Date at AM - PM
	Employee (is) (is not) physically qualified
	For job Med. Dept.
	Important Defects
	REMARKS:
	Disabled From To
	Absence reported to
	on at AM - PM
Reported in Person — by phone — by note other —	
By Messenger (name)	
No report	
REASON FOR ABSENCE:	

GI-359

coördinated by the state departments of health and then in turn by U. S. Public Health Service. This problem has now gone beyond the stage at which it should be considered experimental.



It has definite practical applications, and the stage has been set for more universal application of this public health study.

As a suggestion to those who wish to keep statistics on absenteeism, I would like to show the absentee card we are now using at the Chevrolet-Grey Iron Foundry. It has proved to be indispensable for keeping records on absenteeism (Figure 2). One of these cards is placed in the card rack of each absent employee within 2 hours after he fails to report for work. If he is absent 3 work days, the Medical Department approves his return to work,

and as definite a diagnosis as possible, together with the length of disability in calendar days and work days lost is ascertained. If the employee is absent 1 or 2 work days, the employment department approves the employee for work, obtaining the same information as closely as possible. The front of this card is designed for use by the foremen sending employees to the Medical Department.

In conclusion I would like to commend Dr. Gafafer for his very suggestive and informative paper and to thank him for giving me the opportunity to discuss it.

# Use of the Culture Method in the Clinical Management of Gonorrhea\*

GEORGE SEWELL, M.D., EMILIE CLARKE, M.D., DR.P.H.,  
AND EVERETT NELSON

*Attending Urologist, Social Hygiene Division; Senior Physician, Social Hygiene Division; and Junior Bacteriologist, Laboratory Division; Department of Health, Detroit, Mich.*

DURING the past 1½ years we have been using the culture method concurrently with the taking of smears in the diagnosis and treatment of gonorrhea at the Social Hygiene Clinic of the Detroit Department of Health. In the period ending July 1, 1940, we have examined over 4,500 cultures from persons who have presented themselves at this clinic. These cultures were from men, women, and children of all ages, and represent a good average of the types of cases usually seen in a clinic of this kind in a metropolitan area.

The work was begun in November, 1938, on a small and more or less experimental scale, and gradually increased until August, 1939, when it required the full-time service of a technician. Cultures made during this experimental period together with their more widespread use in our clinic is what we are now attempting to evaluate, for we feel it will answer the questions of those who are planning and have not yet attempted their use.

In general, the methods used are described in the 1936-1937 American

Public Health Association *Year Book* by Dr. C. M. Carpenter.<sup>1</sup>

For the collection of the specimens a previously sterilized swab was used. The swab was not too tightly rolled so as to permit moderate absorption of the exudate. Eight or nine swabs were usually sterilized in a tube, depending upon its size. This swab with its exudate was then immersed in a broth which served to keep the swab moist as well as a diluting fluid. The broth was prepared by dissolving 2 gm. of Proteose peptone No. 3 (Difco) in 100 cc. of distilled water along with 0.5 gm. of sodium chloride.

Sufficient broth to cover the cotton part of the applicator when immersed (approximately 2-3 cc.) was then put in individual tubes and sterilized. Specimens were planted 1 to 2 hrs. after having been taken, or as long as 6 to 8 hrs. if kept in an ice box. The swab was twirled vigorously in the tube until most of the exudate had been transferred from the swab to the broth. One drop was taken up with the swab and streaked across the plate both ways. If the exudate emulsion seemed too cloudy, it was diluted with Proteose peptone No. 3 broth and thus better distribution of growth was obtained.

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

The media used was made by preparing a double strength suspension of Proteose No. 3 agar (Difco) containing 9 gm. of dehydrated media in 100 cc. of distilled water. This was then steamed in an Arnold sterilizer, shaking several times, until the agar was dissolved. This was then sterilized in an autoclave for 20 min. at 15 lb. pressure.

The 2 per cent solution of desiccated hemoglobin (Difco) was made by placing 2 gm. of dry hemoglobin into a mortar and grinding with a pestle, with frequent pouring off of the hemoglobin that had gone into solution, and adding distilled water to the undissolved portion until the 100 cc. volume was reached and most of the hemoglobin had gone into solution. This was filtered through several thicknesses of gauze to make sure no lumps were present and sterilized at 15 lb. pressure for 20 min. We have recently been using another method for dissolving the hemoglobin which was suggested by Miss Wirzikowski<sup>2</sup> of the Toledo Department of Health. By this method 2 gm. of hemoglobin were placed in a rubber-stoppered flask containing 100 cc. of distilled water and shaken vigorously. This was filtered through several thicknesses of gauze and sterilized in the usual manner. Equal amounts of the hemoglobin solution and agar were mixed at 50°–60° C. under aseptic conditions and distributed to sterile Petri dishes. As soon as the media had hardened, the plates were inverted and held at room temperature until used. We found it more satisfactory for planting specimens to use plates that had been poured the previous day.

In the preparation of the differential sugar media, phenol red broth base (Difco) with 0.15 per cent agar was placed in  $\frac{1}{2} \times 3$  in. tubes and sterilized. The individual sugars, 10 per cent solution of dextrose, maltose, lactose, and saccharose, were sterilized by

Berkefeld filtration and added to the semi-solid phenol red broth base with a hypodermic syringe, in sufficient quantity so that a 0.5 per cent sugar concentration was reached in the finished product.

The plates were incubated at 36° C. in an inverted position for 36–48 hours. The concentration of approximately 10 per cent carbon dioxide was obtained by incubating the plates in 5–10 gal. tin cans and placing a lighted candle in the can before putting on the cover. The candle will not burn when the carbon dioxide content becomes approximately 10 per cent.

At the conclusion of the incubation period, the uncovered plates were tilted by being placed on one edge of the cover, so that the 1 per cent solution of para-amino dimethyl aniline monohydrochloride (Eastman Kodak Company), which was sprayed on with an atomizer, drained from the surface of the plate and did not remain on the colonies. Growth of the gonococcus was indicated by the development of transparent convex colonies, 1 to 3 mm. in diameter, having undulating margins and which turned black upon the application of the dye. Cultures are sometimes seen in which the colonies coalesce, having but few isolated colonies at the margins. Only  $\frac{1}{3}$  of the plate was sprayed so that colonies unaffected by the dye could be used for further study and fermentation tests. Under the effect of the dye, the colonies turn pink and then gradually turn black. For satisfactory subculture the transference of colonies should be made during the pink stage, because they are easily killed by the dye.

A typical Gram-negative diplococcus from a typical oxidase positive colony was regarded as the gonococcus.

Fermentation tests were not done on all of the cultures. All of them which were examined proved to be *Neisseria gonorrhoea* except three, one of which

was *Neisseria sicca* and two *Neisseria catarrhalis*.

As soon as cultures were available in sufficient quantity we began using them

in all of our diagnostic and treatment clinics. The majority of our clinicians were not especially familiar with their use, and each acquired his own method

TABLE 1

*Comparison of Results Obtained by Culture and by Direct Examination of Smears*

## Men

Laboratory Test Used		Specimens for Diagnosis		Specimens from Treated Cases	
Direct Smear	Culture	Number of Specimens	Per cent	Number of Specimens	Per cent
—	—	881	74.4	1,043	82.6
+	+	163	13.7	74	5.7
—	+	83	7.0	105	8.3
+	—	56	4.7	41	3.2

Table 1 is a summary of results of 2,446 cultures made from material obtained from male patients, 1,183 being made for diagnosis of gonorrhea and 1,263 cultures being made for test of cure. Cultures and smears agreed in 88.1 per cent of diagnostic cases and 88.3 per cent of treated cases.

TABLE 2

*Comparison of Results Obtained by Culture and by Direct Examination of Smears*

## Women for Diagnosis

Laboratory Test Used		Urethra		Cervix	
Direct Smear	Culture	Number of Specimens	Per cent	Number of Specimens	Per cent
—	—	954	94.9	974	83.1
+	+	6	0.5	51	4.3
—	+	40	3.9	131	11.1
+	—	5	0.4	15	1.2

Table 2 is a summary of 2,276 cultures made from material obtained from female patients who had been presented for diagnosis of gonorrhea. Here again cultures and direct smears agreed in about 91.4 per cent of specimens. The culture was positive in a total of 171 cases in this group when smear was negative.

TABLE 3

*Comparison of Results Obtained by Culture and by Direct Examination of Smears*

## Women for Treatment

Laboratory Test Used		Urethra		Cervix	
Direct Smear	Culture	Number of Specimens	Per cent	Number of Specimens	Per cent
—	—	923	95.1	948	88.4
+	+	13	1.3	34	3.1
—	+	28	2.8	74	6.9
+	—	6	0.6	16	1.5

Table 3 is a group of 2,042 cultures made from female patients who were clinically cured of gonorrhea. In only about 1 per cent was culture negative, although positive direct smear was obtained.

of collecting specimens. Since our clinics are attended in large numbers and the pressure of work is great, it may perhaps be safely said that in many instances no particular care was taken in the collection of specimens. In most instances the smear was taken first and the cultures second. The smears from all cases clinically suspicious of gonorrhea were immediately examined and the patient put under treatment before leaving the clinic. If the patient was still considered clinically a gonorrheal suspect, he was asked to return for another smear and culture if the latter had not already been taken.

It has been a rule in our clinic that all cases presenting themselves to our division are first admitted to our diagnostic clinic for a routine examination for evidence of venereal disease. In the case of females a routine smear is taken from the urethra and cervix and a pelvic examination is made of every applicant.

Cultures were made from 130 male adults diagnosed as having gonorrhea who presented themselves to our diagnostic clinic. These were mostly voluntary patients and presented themselves usually because of certain symptoms

present, such as discharge, frequent urination, etc. Some of these males had various complications such as epididymitis, arthritis, prostatitis, etc., at the time of admission to the clinic. Cultures in this group were not made as a rule on the first visit. These cases were divided into several groups such as acute, subacute, observation, and acute gonorrhea with chronic prostatitis, and so on. These are merely clinical groupings that have developed with experience and aid us in classification for diagnosis as well as treatment purposes.

In the group designated clinically as acute gonorrheal urethritis—including those with associated prostatitis and epididymitis it will be seen that there were about 8 per cent of cases where the culture was negative although the smear was positive. We have felt that this might be due to one or more of several things and need not be a criticism of the culture alone. This group is the most difficult of all patients to control and is the one group where patients' own statements are least reliable. These patients present themselves at the clinic at various stages of the disease. Most of them

have had something injected locally and many have had internal treatment given them either by a previous physician, druggist, or friend. Many of late have been on sulfanilamide medication which no doubt would have a deleterious effect on cultural growth of the gonococcus. The method of obtaining specimens for cultures may also have some bearing on later growth. In order to obtain a more rapid diagnosis we have routinely used the direct smear in this group—if this was negative by Gram's stain the patient would be asked to return in 24 hours. At his second visit 24 hours later direct smears would again be taken and at this examination a culture would also be taken. Thus 2 sets of direct smear were taken within 24 hours and one culture taken at 2nd visit, so that the direct smear was given 2 chances to 1 for the culture. In a small group where cultures and smears were taken routinely from smear positive acute cases and above factors were ruled out, gonococcal growths were almost always obtained.

In the groups designated as observation gonorrhea, chronic prostatitis, and observation gonorrhea and chronic prostatitis, the cultural method of diagnosis was a distinct aid. In these groups clinical manifestations were not

sufficient to establish a definite plan of attack. In these groups combined, the cultural method picked up nearly three times as many positives as did the direct smear examinations alone. This was not only of value in preventing the necessity of repeated examinations, but also aided us in beginning treatment earlier and thus controlling the possibility of spread of infection that much earlier. There is no doubt that this group of patients is largely responsible as far as the male is concerned in the promiscuous spread of this disease.

The diagnosis of gonorrhea in the female has always been considered a problem chiefly because of the tendency of the disease to become chronic. Although some patients do present themselves voluntarily because of a discharge, burning on urination, pain due to Bartholin abscess, or pain from a salpingitis, a great majority of our female gonorrhea is found in contacts to known cases of gonorrhea, who therefore are requested to come in for examination. Other cases are found in the routine examinations for venereal disease and in alleged prostitutes who are held for health examination by the police department. This was well illustrated in the study of 148 females subsequently diagnosed as having gonorrhea.

TABLE 5  
*Laboratory Results*  
148 Women — Diagnostic Cases

Smear	Culture	Discharge	Contact	Routine	Police	Burning on Urination	Bartholin Abscess	Check on Previous Positive Culture	Total
+	+	5.4	8.8	5.4	0.7	...	2.0	...	22.3
+	—	0.7	4.7	1.4	...	0.7	...	...	7.5
—	+	4.1	35.0	12.8	5.4	...	...	2.0	59.3
—	±	...	0.7	4.1	...	...	...	...	4.8
N.C.D.	—	...	2.0	0.7	1.4	...	...	...	4.1
N.C.D.	+	...	...	1.4	...	...	...	...	1.4
+	±	...	0.7	...	...	...	...	...	0.7

Table 5 is a chart of results obtained from cultures and smears in the diagnosis of gonorrhea in women. The most important group here is the contact group wherein 35 per cent of cases were positive by culture, although negative by smear.

It will be noted that the contact group was the largest and that these were diagnosed principally by the culture method. It was noted that although these patients did not complain of a discharge, a purulent or mucopurulent cervical discharge was found in the majority of cases and was often accompanied by an eroded cervix. Occasionally a Skenitis or salpingitis was found. We have been taking urethral and cervical smears and cultures on all females in both the diagnostic and treatment clinics. The cervical smear or culture was taken first because we felt that the insertion of the speculum might aid in forcing out any discharge from the urethra and thus give a better urethral preparation. It was also found that when considerable cervical discharge accompanied the swab the growth of the gonococcus was not very luxuriant or was entirely absent. Stout and Todd<sup>3</sup> have advised wiping away all surface discharge and getting material well up in the urethra and cervix.

Cultures have also aided us in reducing the load in our female diagnostic clinic. Prior to their use it was the policy of our clinicians to request from 1 to 5 check slides upon known contacts, or clinically suspicious cases, as for instance, a patient with an eroded cervix, purulent or mucopurulent discharge, Skenitis, etc. In a previous study of 115 female gonorrhea cases when smears alone were used, it was found that 80 per cent of our cases were diagnosed on the first smear, 12 per cent on the second smear and the remainder on 3 to 5 smears. With the advent of cultures it was decided to use only the smear at the first examination; if this was negative, a smear and culture were to be taken upon all gonorrheal suspects at the next visit, which was usually 1-7 days after the first admission to the clinic. If further tests were felt necessary the clinician

usually requested a slide after the next menstrual period. We have felt therefore that the culture method has been of distinct value in the female clinic, particularly in the contact group because it enables us to keep both marriage partners under treatment at the same time as well as keep down the probable reinfection of children in the home.

We have also used the culture method in the diagnosis of gonorrheal vaginitis. Much of this work was done by the dry or applicator method of collecting the material, which we feel is not very satisfactory. We have recently changed to the wet or catheter method described by Benson,<sup>4</sup> but we are not ready to report on this work. In general, we feel that it is far superior to the dry method.

Sulfanilamide has been adopted as the standard treatment in our clinic although neoprontosil, uleron, promin, sulfapyradine and allied drugs have also been used. Local chemical treatments and biologicals have been prescribed when reactions to sulfanilamide occurred or when clinicians felt that their use was indicated. Dosages varying from 40 to 50 grains daily depending on body weight were prescribed and this dosage maintained for a period of 1 month. Smears were taken after the first week of treatment and continued weekly until 5 consecutive slides were negative. A culture usually accompanied the 4th slide although some clinicians preferred to take cultures at other times during the period of treatment. After 5 consecutive negative slides and a negative culture the patient was asked to return in 1 month for a slide and culture. Female patients were requested to return in 1 month—after the next menstrual period. Subsequent follow-up was left to the discretion of the clinician and depended principally upon the results of laboratory and clinical findings. Prenatal

patients were requested to return every month until delivery, for a slide and culture.

In a study of 76 females in which smears and cultures were taken to determine cure, 26.5 per cent were found to be positive by both the slide and culture methods. In 6.5 per cent the smear was positive but the culture negative; 62 per cent were negative by the smear but positive by the culture method. Of the latter there were 34.4 per cent who had from 5-12 negative smears, and on that basis would have been dismissed as possibly cured had the smear method alone been used. These could be classified as potential carriers although the possibility of reinfection could not be ruled out. This has also been pointed out by Carpenter in a recent article.<sup>5</sup>

Previous to the use of cultures the chief criterion of cure in the male adult has been the examination of smears obtained after prostate massage. An arbitrary standard of 5 consecutive such prostate smears was necessary before a patient would be discharged as "probably cured." In a study of 153 males who were considered clinically well, 32.7 per cent were found positive by both slide and culture methods. In 45.7 per cent the slide was negative but the culture was positive. In an additional 4 per cent culture was doubtful positive and slide negative. Only in 17.6 per cent was the single culture negative, although one or more of the several slides taken were positive. This again may not be entirely a failure of the culture itself. Several factors may be blamed in this 17.6 per cent of failure of cultural growth in these 27 cases (17.6 per cent of the total). First it might be stated that in most cases only one culture per patient was made, whereas 5 or more smears were made on each patient up for discharge. Again, inasmuch as these smears and the culture were made from material

obtained after prostate massage, often there was not enough material available for both procedures. Two smears were taken first and then the culture. This could leave the material available for culture as less potent than that used for smears. Again the effects of previous treatment may not have been sufficiently worn off so that organisms were found in direct smear but would not grow on cultures.

Stout and Todd<sup>3</sup> have expressed the possibility of the organism being dead when vigorously treated. Of these 27 cases, 11 were on sulfanilamide or allied drugs at the time that cultures were taken, 9 were receiving local irrigations, and in only 7 no treatment was being received. Of course in this class of people many patients use additional treatment unknown to the clinic physicians. It is therefore felt that the culture, when above factors are guarded against, would be a very reliable index in the test of cure.

However, it is a practical fact that in many instances the above factors cannot definitely be excluded so that the smear method should not be discarded, but that smear and culture both should be used. It is also apparent that the direct smear is the more practical for the private practitioner. However, for use in public health clinics, cultures have been a valuable aid and are becoming established as a routine procedure. There is no doubt that further extension of the use of gonorrhea cultures will be a great factor in the public health control of this disease.

#### SUMMARY

1. In this study of more than 4,500 cultures which have been made to determine the presence of the gonococcus in men, women, and children attending the Social Hygiene Clinic of the Detroit Department of Health, we have found Difco proteose peptone No. 3 agar



with 2 per cent hemoglobin to be satisfactory for gonococcus growth.

2. The use of gonorrhea cultures has been of distinct value in:

- a. The confirmation of a clinical diagnosis of gonorrhea especially where the disease was chronic in both males and females.
- b. The isolation of gonococci from sex contacts, especially females—who would be usually unaware that they harbored the disease.
- c. They were an aid in the determination of the time for discharge as probably cured, as many times the slides would be negative before negative cultures were obtained.

Occasional negative cultures were obtained although direct smears were positive and clinical findings were suggestive. Thus we do not feel that the direct smear should be discarded in favor of the culture method alone, but that most efficient results will be ob-

tained if the two are used together. The direct smear may aid in getting patients under treatment earlier and the culture will aid in discovering cases not otherwise apparent and will be of exceptional value in preventing release of patients still in an infectious condition. Thus a more widespread use of the culture method in public health clinics will be a great aid in the public health control of gonorrhea.

#### REFERENCES

1. Carpenter, C. M. *American Public Health Association Year Book*, 1936-1937.
2. Wirzikowski. Personal Communication to the author.
3. Stout, B. F., and Todd, D. A. Observations and Notes on the Culture of the Gonococcus. *Texas State J. Med.*, 34:211-214 (July), 1938.
4. Benson, Ruel A. Gonorrheal Vaginitis in Children. *Arch. Pediat.*, 55:632-638 (Oct.), 1938.
5. Carpenter, C. M., and Westphal, Robert. The Problem of the Gonococcus Carrier. *A.J.P.H.*, 30:537-541 (May), 1940.

# Place of Maternal and Child Health Services in a Generalized Program in a Health Unit\*

WILLIAM J. FRENCH, M.D., F.A.P.H.A.

*Health Officer, Anne Arundel County Health Department, Annapolis, Md.*

THE latter part of 1939 the Children's Bureau of the U. S. Department of Labor through the Maryland State Department of Health inquired whether the Anne Arundel County Health Department would be interested in adding delivery and pediatric services to our program. Before accepting the offer, we paused to take stock of what we already had in order to determine whether or not such services would be feasible in our county and whether we could integrate them with what was already in operation. It is necessary to know something of what we were doing in order to understand fully what we are doing now, and so the following summary of conditions in the county is presented.

## THE COUNTY PROGRAM

Anne Arundel County stretches from the southern border of Baltimore about 50 miles along the Chesapeake Bay. It has a population of 65,000, of whom 25 per cent are colored. These last are fairly evenly distributed, with the greatest concentration in and about Annapolis. The white population is of American stock. There are no foreigners. That part of the county contiguous to Baltimore is suburban in character, but the rest of it, with the exception of Annapolis, is strictly rural. General agriculture, tobacco raising, and fishing are the chief means of

livelihood. There are no manufactures. Annapolis is the only incorporated town and has a population of about 13,000, exclusive of the U. S. Navy personnel and midshipmen at the Naval Academy.

There is one general hospital of 100 beds located in Annapolis. This is a semi-private institution, operated by a self-perpetuating lay board, and receives financial assistance from the State, County, and City of Annapolis. There are 28 resident physicians, 3 of whom are colored, exclusive of those attached to the Naval Academy, Fort Meade, and state institutions. In addition, there were about 27 midwives.

A full-time health department has been in operation since 1930. It began as a four piece unit, but has gradually expanded until, in the fall of 1939, it consisted of a health officer, assistant health officer, sanitarian, nurse supervisor, 7 field nurses, and 3 clerks, a total of 14. The health program is a generalized one, consisting of services to prenatal and postnatal cases, well infants and preschool children; communicable disease control, including tuberculosis, venereal diseases, and pneumonia; supervision of the health of school children, including dental service, child guidance, orthopedic service; and a sanitary service, embracing water and milk control. These services are applied through clinics, home visiting by public health nurses, sanitary inspections, surveys, etc. The maternal and child hygiene clinics, for both white and colored, are held at stated times in various parts of the county and are conducted by the health officer or his assistant, often with the assistance of local physicians. Standard prenatal care is given. Abnormal cases are referred to a special clinic in Annapolis conducted by a specialist from The Johns Hopkins Hospital. Other special clinics, such as tuberculosis, child guid-

\* Read before the Maternal and Child Health Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

ance, and orthopedic, are conducted by specialists from Baltimore. A nutritionist attached to the State Department of Health spends considerable time in the county, advising the nurses and helping in the clinics. Other specialists attached to the State Department of Health are available when needed. The county is used as a training center for state personnel, for field work for health officers by The Johns Hopkins School of Hygiene, and as a field training center for public health nurses by William and Mary College and the Catholic University.

Two years ago, in order to make the health program more elastic and to bring public health a little nearer to the people, the county was divided into 7 districts, with a nurse in charge of each. In addition to the central administrative offices in Annapolis, there is a health center in each district.

The physicians in the county are coöperative. They support the health program and make extensive use of the nurses and of the clinics. It has been our policy to have as many of them as possible participate in the health work by helping in the clinics. Eight different doctors help in this way each month. At the request of the health officer, the Medical Society appointed a committee to advise with him. A similar committee, which includes the health officer, acts in an advisory capacity to the County Welfare Board and the Red Cross.

Relationships between the department and other official and private agencies are cordial and there is free exchange of services. Five of the 7 health centers are maintained by local health associations formed for the sole purpose of promoting health work in their localities. Individual service, including transportation, is available at all the clinics. Women's clubs, Parent-Teacher Associations, and other groups have health committees who either work with the nurses or help in some other way. Our friends and supporters, they serve a valuable purpose in translating the work of the health department to their neighborhoods in language which is readily understood. Through their advocacy, much is accomplished in a shorter time than would otherwise be possible.

Although we had no delivery service and no pediatric service, we considered we had a fair set-up. We handled about 300 women each year in our prenatal clinics and got post-natal examinations on most of them. Not many infants and preschool children escaped us. We did and still do much preventive work with them, including vaccination and immunization. We used the local hospital to

a considerable extent, but most of our abnormal prenatals and ill children were sent to hospitals in Baltimore. However, we had begun to have a strong suspicion that we would never have a really generalized, preventive program until we made provision for some sort of help at delivery. The survey of our set-up and resources showed no reason why this could not be done. On the contrary, there seemed every reason, including the progressive attitude of our physicians and public generally, why we should undertake it. Having reached this conclusion, we presented the proposed plan to the State Board of Health, the Medical and Chirurgical Faculty, the local Medical Society, the County Welfare Board, and other groups, all of whom approved it.

#### PROPOSED PLAN

The Children's Bureau's proposals, while leaving to us the working out of details, were specific as to what should be done. They included the giving of adequate prenatal care, delivery service, and pediatric service to two groups—those who cannot afford to pay anything, and those who, while able to pay a physician, cannot afford to pay for trained nursing service, the services of specialists, or hospital care, should these be required. This second group embraces those families who, while able to live decently and pay their way, have no surplus. They can buy food and clothes, pay rent, and perhaps carry some insurance. They can also pay moderate fees to a doctor for delivery or for occasional medical service to the children. But if complications arise and special medical service or hospitalization is required, they are sunk. Neither can they afford the kind of professional nursing care which we now recognize as essential at the time of delivery. In my opinion, service to this group is the most interesting and valuable part of the program, constituting a pioneer effort to apply these legitimate public health activities to a group of the population who will benefit most from them. Funds were subsequently budgeted for the following purposes:

1. To pay physicians for prenatal care and delivery service to those in special need.

2. To furnish nursing service to this group at the time of delivery, and to those who while not in the lower economic groups are still without sufficient resources to pay for adequate nursing care at the time of delivery.

3. To provide hospital care for both groups provided cases are sufficiently abnormal to make hospitalization desirable, or provided home conditions are so bad that home delivery would be indecent or dangerous.

4. To provide medical care and hospital care when indicated for ill children whose parents are unable financially to furnish this themselves.

5. To provide the services of specialists to conduct maternity clinics (antenatal and postnatal examinations, and advice), and pediatric clinics and to serve as consultants when such special services are needed.

6. To provide for other specialists, special services, supplies, equipment, or personnel, as the needs of the plan indicate.

It took about 2 months to get this program in operation. The delay was caused largely by difficulty in finding adequately trained public health nurses, and by delays in the delivery of supplies and equipment. We took advantage of this period to study what others who were conducting similar programs were doing. We also used the time to evolve standing orders for our nurses, a fee table for the physicians, an agreement with the local hospital, and various forms, methods of book-keeping, etc.

#### HOW IT WORKS

At this writing, the program is in full swing. Our nursing force has been doubled; we now have 2 supervisors and 14 field nurses. Each district has 2 nurses, each serving a population of about 4,500. The nurses take turns on "first call" for delivery service. While they are waiting for a case to come off, they carry on all the other activities demanded of a generalized program. When one nurse is on a case or off duty, the other nurse carries on. If both nurses are on deliveries, a nurse from a "quiet" district is shifted over to

take care of current work. This plan is working satisfactorily.

#### WHAT THE NURSE DOES

The standing orders for nurses include material under the following headings: (1) Method of calling nurses, (2) policies governing nursing service at delivery, (3) conditions of work, (4) field nursing services, (5) nursing duties on delivery, (6) care of the infant, (7) nursing equipment, (8) care of equipment, and (9) records.

Orders provide among other things that the physician and nurse shall arrive at and leave the patient's home simultaneously. Except in emergency or on special request of the physician, calls are not accepted unless the patient has been admitted to the maternity service. The nurse will demonstrate to some responsible member of the family the care of the mother and infant. Whenever possible, the services of the Red Cross and Metropolitan nurses will be used for subsequent bedside care. Our nurses are permitted to take the blood pressure and to test urine for albumin. Their equipment consists of the regular nursing bag, a delivery bag, maternity pack, loan pack, Tycos, and stethoscope.

#### REGISTRATION OF CASES

Maternity cases are registered for care in the following manner:

1. Directly by the doctors, either over the telephone or in writing.

2. A doctor may likewise register cases with the nurse in his district, in which event the nurse will in turn register the case in the central office as early as possible. However, the nurse cannot arrange the matter of fees, which must be taken up by the physician himself with the health department.

3. The nurses will frequently come in contact with cases that they think should come under this program. If the case has a physician, the nurse will contact him and ask if he wishes to have it registered. If the case has no physician, it will be urged to select one. When a doctor is selected, the nurse

will report the case to the central office, which will in turn get in touch with the doctor, asking him if he will accept it and if he wishes to register it.

4. Cases can be registered through a clinic. Pregnant women who come into a clinic and have no doctor will be asked to choose one. When this has been done, the same procedure will be followed as in the last paragraph. Only physicians can register cases.

Under no circumstances will health department nurses be present at a delivery on the request of the family only.

To which group a particular case belongs is worked out at the time of registration through reference to the County Welfare Board.

Ill children are handled in much the same way. Also a pediatric clinic is now in operation in Annapolis, conducted by a pediatrician from Baltimore. Cases are referred to this clinic by private physicians and the health officer. The pediatrician examines, diagnoses, and outlines the treatment to be given, but does not give treatment himself.

#### THE COMMITTEE OF THE COUNTY MEDICAL SOCIETY

From the beginning of the program, the health officer has had the assistance of a special committee of the County Medical Society, which helped construct the standing orders above mentioned and the fee table which follows. On their recommendation, both were approved by the Medical Society. This committee is now a permanent part of the program and will play an important part in its success. Their interest can best be expressed in the words of one of the members at a recent meeting: "This is a good program for which we medical men have a definite responsibility. If it fails, it will not be because we have neglected to give it our support."

#### THE PROBLEM OF FEES

Because of its importance and the

light which it throws on the program, the fee table is given in full.

*Delivery Service*—For the delivery of cases contacted and reported to the health department before the beginning of the 5th month, and provided the family cannot afford to pay, \$25. For the care of such cases, if they abort or miscarry, \$15. Part payment arrangements can be made. If a family can pay part, it will be encouraged to do so. Part payments will be used to reduce the amount paid by the health department. The County Welfare Board will be asked to help determine lack of ability to pay.

For prenatal care rendered the above cases and begun before the 5th month—\$10, provided care is given in the physician's office and consists of a thorough physical examination, pelvic measurements, blood pressure, Wassermann, urinalysis, height and weight, and that urinalysis, blood pressure, and weight are to be taken at least monthly thereafter. Twice monthly in the 8th and 9th months is recommended. If the physician prefers, prenatal care will be given in one of the prenatal clinics, in which event \$5 will be paid to the physician, and he will be kept informed regarding the patient's condition. Under this arrangement, and during the prenatal period, the physician should see the patient at least once in his office, or if he prefers, in the clinic. A post-natal examination is to be made approximately 6 weeks after delivery. At least three visits should be made by the physician to uncomplicated cases during the first 10 days after delivery.

Deliveries in the hospital will be paid for, for the present, on the same basis as above.

Cases registered after the 5th month will at present be paid for as follows: delivery, \$20; prenatal care, \$5, if given in the physician's office, \$2.50 if given in a clinic. Right is reserved eventually to discontinue payments for cases re-

ported after the 5th month. This does not apply to emergencies and probably will not affect nursing service.

For consultation service a local qualified man may be employed at a fee of \$5. Also, an additional physician may be employed when necessary to help at a delivery, such as giving an anesthetic, etc., at a fee of \$5. An obstetrical consultant was appointed on the staff of the local hospital and is available for consultation service on demand.

A physician should seek consultation under the following circumstances:

1. Placenta previa or premature separation of the placenta
2. Fulminating pre-eclampsia or eclampsia
3. Infected incomplete abortions
4. Labor of over 30 hours
5. Mid-forceps for posterior or transverse occiput presentations
6. All high forceps
7. Podalic version except on a second twin
8. Caesarean sections
9. Severe puerperal infection
10. Destructive operations
11. Shock developing during labor or after delivery
12. Symptoms suggestive of rupture of the uterus.
13. Pregnancy following caesarean section
14. A diagonal conjugate of less than 11 cm

There will be no extra fees for these operations, other than the \$5 consultation fee, except after reference to the Medical Committee, who will determine any extra fees to be paid in any particular case, but in no case will more than \$50 be paid for any delivery.

Delivery fees will be the same for either hospital or home deliveries, but in order to collect for the latter, the physician must have made use of the health department nursing service.

Delivery fees will be paid on presentation of properly made out and certified bills, presented 6 weeks after delivery and after a postnatal examination has been made, except in circumstances satisfactory to the Medical Committee. In the case of hospital deliveries, a copy of the hospital record will be furnished

the health department to file with the department records.

It is understood that health department nurses are to help with those home deliveries for which the health department pays, and are available for those cases, which, while able to pay the doctor, cannot afford nursing service. Requests for this latter service should be made at least 2 months before the expected date of delivery.

*Pediatric Service*—For visits to children whose family cannot afford to pay a physician, first visit \$2, second visit \$2, care for the first week \$5, provided at least three or more visits have been made. For the second week \$5, provided at least three or more visits are made. Fees for cases prolonged past 2 weeks are to be decided on their merits by the Medical Committee. Visits to cases in the hospital should be less because the physician in going to the hospital may be able to see two or three cases at once. Fees quoted are to include mileage.

*Operations*—Operations will be paid for only after reference to the Medical Committee, but in no case shall a fee for any one case exceed \$50. Tonsil operations must be done in the hospital. No fees will be allowed for circumcisions.

The question of who shall be served, in both obstetrical and pediatric cases, will be decided by the health department with the help and advice of the County Welfare Board and the Medical Committee.

It is requested that a pediatrician be appointed on the staff of the hospital as consultant.

#### MISCELLANEOUS

Records of prenatal and delivery cases, infant and children records, paid for by the health department, shall be made on health department forms.

When requested, a nurse will accompany a physician to visit an ill child.

It is understood that the health officer is a member of the Medical Committee.

The above fee table is tentative and may be revised from time to time with the advice and consent of the Medical Committee, which will in turn submit such revisions to the County Medical Society for its approval.

Our arrangement with the hospital provides that maternity cases will be cared for at the rate of \$4.50 per day, and \$1.00 per day for the care of the baby. This is a flat rate and includes all charges except unusual or costly medicine. Children are hospitalized at \$2.50 per day. Abdominal x-rays of pregnant women cost \$3.

#### THE MIDWIFE PROBLEM

At the beginning of the program, there were many rumbles of dissatisfaction from the midwives for whom no provision is made. A nurse midwife, borrowed from the State Department of Health, undertook to clear this situation with the result that 13 of the 27 midwives whom we had on the list decided to quit practising and turned in their licenses. The others were given special instruction in groups and singly, the nurse midwife helping them with some of their deliveries. They are now asking our nurses to be present at deliveries and to supervise their work. We are planning to appoint a nurse midwife to our staff. While part of her time will be spent in midwife supervision, she will be used primarily in a supervisory capacity to teach and help our nurses with their maternal technic.

#### RESULTS OF THE PROGRAM

By September 1, the program having been then in operation 6 months, we had registered 90 cases for delivery and the nurses had assisted at 49 actual deliveries. Eight other registered cases have been delivered in the hospital. Eleven physicians have made use of this new service. Forty-four children

have been given medical service. So far, no serious difficulties have arisen and we do not contemplate that any will arise. The hospital has been slow about making some improvements necessary to our requirements, but there is evidence that they will make them in a short time. Only favorable comments have been received from the doctors and the public generally. Cooperation has increased; the Red Cross, for instance, is doing much of the postnatal bedside nursing.

We have had no trouble in integrating these new services with our original program. All services appear to be increasing in effectiveness, especially child hygiene. For some time, our nurses have been visiting all new infants, but due to delays caused by the machinery of birth registration, from 1 month to 6 weeks sometimes elapsed before the nurse knew about them. Fifty per cent of our infant deaths in 1939 occurred during the first month of life. Relatively few of these were reached before they died. Under the new program, many infants will be taken under supervision immediately at birth. With this, plus good prenatal care, we should be able to reduce neonatal deaths. Through the pediatric service, we have already been able to save the lives of several infants and small children. We will never be able entirely to eliminate maternal deaths. Occasional accidents will happen, but we should be able to reduce them to a minimum and we should be able to reduce postnatal ill health which at present afflicts so many of our women.

One other thing remains to be considered and that is cost. If we expended all of the money available from all sources, approximately \$75,000, the health work for all activities including payments to physicians, hospital, etc., would cost about \$1.15 per capita, not great when you consider the extent of the services rendered.

# A County Health Unit with Proper Functioning Maternal and Child Health Program\*

ISADORE DYER, M.D.

*Obstetrical Consultant, Oklahoma State Health Department, Coöperative District 1, Tahlequah, Cherokee County, Okla.*

THE ideals in a proper functioning maternal and child health program embody certain elements, the presence or absence of which affect its success. To list these, not particularly in order of importance, one must include the value of lay teaching, field nursing service with individual teaching of the patient, conferences wherein the patient may seek medical advice and concrete service, provision for medical attendance at delivery, care of the well baby, nurse attendance at delivery, and, last, medical consultation for the rural practitioner whenever he needs it. Such a given program would thus offer continuous care to a patient and eliminate the gaps wherein maternal and fetal mortalities are apt to occur.

Nursing home visiting in itself admits of tremendous merits, but teaching alone does not uncover subtle abnormalities, nor can we expect a field nurse to diagnose them. With regular periodic conferences, her work can be aided by the obstetrician and pediatrician, who in turn offer some medical advice to the patient.

In rural communities such as ours, over 50 per cent of the total population is unable to afford a medical attendant at delivery. This results in total absence of care at a most crucial moment in the entire pregnancy cycle. Often a mother is given service and taught throughout her pregnancy, only to be abandoned and left to her own resources at time of delivery. This is a definite gap. We cannot overlook the maternal deaths due to infection, and those due to hemorrhage or neglect and still say we have a working program.

If any effort is made to help the rural general practitioner in his necessary part in the program, then nurse attendance at delivery is important. Comparatively few rural men have the facilities, the time, and often the ambition to prepare and carry necessary delivery equipment. With housing facilities as they are, few extend themselves to prepare the room or their patients properly. Perhaps criticism here is justified, but it is understandable to those who have tried rural practice without outside help. The presence of a nurse with necessary supplies, to stand by the doctor in his convictions when the family is begging for pituitrin to be given—someone to prepare the room,

\* Read before the Maternal and Child Health Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.



the bed, the patient, to give enemas, and do all of the work he might neglect because of taboos and superstitions—is of invaluable aid. Physicians soon learn to coöperate to the extent of almost demanding such service, often wondering how they did without it in the past.

Should every community be fortunate enough to have an obstetrician and a pediatrician, the problem of care for the rare or complicated cases would be met. This is seldom true of a rural area, and rural practitioners have had little opportunity to progress in the specialties of medicine. With consultation service available to both the physician and the patient when the need is acute, the total health program is complete.

It was along these lines that the program in Cherokee County was finally determined. Naturally the results were not all arrived at overnight and they were not accomplished as simply as this reads; yet in substance the ideals outlined above exist in the program today.

#### THE COUNTY PROBLEM

Cherokee County is one of five counties included in the Coöperative Health District No. 1 in Northeastern Oklahoma. The total area of 3,388 square miles is situated in the foothills of the Ozark mountains. The population of 92,000 is composed of 73 per cent white, 23 per cent Indian, and 3 per cent colored inhabitants. Only two towns boast a population of 2,000 and none is over 3,500. There are approximately 35 physicians serving this area. Cherokee County comprises one-fifth of the population.

The people themselves are for the most part poor. Housing is an acute problem. Many families with 6 or even 8 to 10 members live in one or two room log huts, often without floors or windows. Their superstitions are a pot-pourri of the usual run of everyday lore, combined with that of the early pioneers and Indians. Their living

habits are relative to their income. Sanitation and water supply needs are frequently acute. If something could be done to better their economic status, progress would be far more rapid in the field of public health. Only too often despite instruction and an appreciation of the needs for betterment by the family, nothing has been done to correct the conditions because of lack of financial backing.

The practising physicians in Cherokee County at the start of the maternity program totaled 6. Of these, 3 were over 65 years of age and only 1 was under 40. One young man has been added during the past 2 years, and 2 older men have practically retired. All but 1 live in the county seat.

With the above conditions present, both with the type of county resident and the roster of rural general practitioners, the stage set was about average for a strictly rural area.

#### THE MATERNAL AND CHILD HEALTH PROGRAM

To conform with the ideals mentioned previously, the following program is in operation: There are 5 nurses who divide the county into equal areas depending upon school population. Each nurse conducts a generalized program in her district and her records are kept in her individual file. Upon her shoulders rests the responsibility of the care of the families in her given district. She is likewise responsible for the conferences held in her district.

There are 7 maternity conferences conducted in Cherokee County each month (of a total of 19 for the district), one site being used twice a month. Four child health conferences are conducted each month (of a total of 15 for the district), and, again, one site is used twice monthly. These medical conferences are conducted on distinct days. All are permanent. Their location has depended upon the particular case load

and needs of the community as well as the distances which the patients would have to travel. Even then, many travel from 10 to 20 miles in wagons, on horseback, and occasionally crossing the river by boat. In this manner the county area is covered. The conference case load varies between 8 and 30 maternity patients, and the attendance of children is higher.

For the larger conferences an appointment schedule is in force. The time is taken up with the usual nursing conference, display of demonstration material, talks to mothers in groups, visual teaching, and a complete medical examination. This includes, for all prenatal patients, a blood test for syphilis, vaginal smears and cultures if necessary, external pelvic measurements and an internal pelvic examination with correction of uterine displacements and erosions. Much of the time available is spent in teaching the mother the important phases of maternal care.

At the child health conference the infants and preschool children receive a complete medical examination. Immunizations are given for smallpox, typhoid, diphtheria, and whooping cough. Blood tests are obtained on all potential congenital syphilitics. The mother observes demonstration material and is schooled in the field of well baby care, hence parents are encouraged to attend as often as possible. Corrections are advised either by letter to the private physician or through the Crippled Children's Commission.

Physicians are encouraged to utilize these conferences in regard to consultations. Often they accompany the patient. At two monthly maternal and child health conferences the local physician attends and assists.

In Cherokee County, funds are available to purchase medical care for indigents at the time of delivery. These fees are derived through Social Security funds and are on a sliding scale. For

delivery alone, a physician receives \$15. For delivery and prenatal care during the last 2 months \$17.50, after the 5th month and prior to the 8th month, \$20, and prior to the 5th month \$25. These fees are paid after complete postpartum care has been given though it sometimes requires more than the one 6 weeks' examination to correct obstetric injuries. An added fee of \$5 is paid once for travel over 10 miles.

#### HOW THE PLAN WORKS

To illustrate the plan now in practice, a patient presents herself to one of the maternity medical conferences. She receives a complete examination as outlined. If she states that she will be unable to purchase medical care for delivery, her indigent status is determined by a medical social worker who visits her in her home. Added to her findings are the opinions of the field nurse and physician. Often the social worker can help a family plan their budget properly so that they are able to pay for their own care. Occasionally a family will make efforts to settle previous indebtedness to their physician (which otherwise would deny care due to lack of credit), while the present pregnancy is taken care of by the program. If indigent, the patient makes her choice of physician and is referred to him immediately by letter.

Physicians residing out of Cherokee County may participate providing the patient lives in Cherokee County. When this referral is made, a blank maternity record is sent the physician and he assumes full charge. The patient herself is not seen again at a conference unless sent in for consultation by her doctor, because of some abnormality. Field nursing visits continue and reports are given the physician by the nurse. If a patient is lax in reporting regularly for prenatal care, the physician notifies the department and a home visit is made immediately.

## Minimum Qualifications for Nutritionists in Health Agencies\*

IN view of the great advance in the science of nutrition and the realization on the part of public health workers of the important rôle which nutrition of individuals plays in maintaining well-being, there is an increasing need for properly trained workers to carry on programs of nutrition education in the field of public health. The past few years have seen a marked increase in the employment of nutritionists by public health agencies in states, counties, and large municipalities. It is anticipated that many more of these agencies will be desiring nutrition services, thus increasing the demand for qualified, professionally trained nutritionists. For the most part the nutritionist serves as a consultant working through the staffs of all divisions of the health agency that are concerned with nutrition. When a large agency employs a number of nutritionists, the duties of the workers obviously vary widely from those of the supervisor to

those of the staff members working under close supervision. At present the most common type of position is that of a consultant who works under the administrative direction of the chief of a major division of the health agency and who is largely responsible for the technical content of her program. The qualifications set forth below apply to that type of position.

These qualifications have been prepared as an aid to: (1) colleges and universities training nutritionists and those arranging public health nutrition curricula, (2) municipal, state, and federal departments of civil service, (3) employers selecting nutritionists, and (4) individuals in guiding their preparation for service in this field. The purpose of this statement of qualifications is to serve as a guide for new appointments, but the importance of additional preparation for those already employed should not be minimized.

*I. Definition*—The nutritionist in a public health agency is a professionally qualified person who directs or carries on a program of activities dealing with the application of the scientific knowledge of nutrition to the prevention of disease and the promotion of positive health. The nutrition program of a health agency is directed toward strengthening the service that the agency is rendering in promoting well-being among groups and individuals in

---

\* Preliminary Report of the Subcommittee on the Educational Qualifications of Public Health Nutritionists.

This report conforms to a statement of the Joint Committee of the American Home Economics Association and the American Dietetics Association, dated July 20, 1940.

The Committee on Professional Education of the A.P.H.A. publishes this report to permit the members and Fellows of the Association to review it and to offer criticisms and suggestions in the further consideration of the report.

This report, like all other statements of the committee on professional and technical qualifications in public health, is subject to periodic revision in order that it may be kept abreast of the best thought.

competitive factor is eliminated, the physician has learned to rely upon this type of assistance, and thus many serious accidents have been avoided, to say nothing of the postgraduate teaching accomplished. The number of consultations in the district per month amount to 15 to 20 for each consultant.

Operative deliveries are accomplished in the home. Complete operative equipment is available and, when used by the consultant, an additional nurse is employed. Hospitalization for white patients is possible in Tahlequah. For this the local and only hospital is used. It is a two story home so converted. An average of 10 patients per year are hospitalized, the cost being borne by the local county. Persons having one-half or more Indian blood are hospitalized at the Indian Hospital in Tahlequah.

#### RESULTS OF THE PROGRAM

In 1937 there were 322 births recorded, with a maternal mortality of 6.2 per 1,000. In  $2\frac{1}{2}$  years, over 1,100 mothers have been admitted to service in Cherokee County. It is estimated that last year alone approximately 60 per cent of all the recorded deliveries (485) were attended by physician and nurse in the home. Ten per cent were delivered at the Indian Hospital and 5 per cent at the other local hospital. Thus 354, or 75 per cent of all recorded deliveries, received complete care. Sixty per cent of all patients seen are classified as medically indigent. During the  $2\frac{1}{2}$  year period there were 2 maternal deaths, neither of the women having been admitted to service. One, an eclamptic who reached us after 8 hours of convulsions, died in 2 hours, and the other died on her 14th postpartum day of what apparently was a pulmonary embolus.

The time allotted does not permit of detailed discussion of other phases of the program—the school program, lay

talks and lay participation, the treatment of syphilis during pregnancy by the local physician, the parasitic survey now being made, the dental service soon to accompany all conferences, tuberculosis control, and the many other elements entering in any public health program which constantly affect maternal and child health. One interesting detail is found in the reorganization of the County Medical Society. It meets monthly with the Indian Hospital staff, and a clinical program is presented. Problems in the county are discussed and didactic papers are presented.

When questioned as to the reaction of the local physicians to our efforts, the answer is found in the County Medical Society where for the past 2 years the director of the Unit has been elected president and your essayist their secretary.

There is something very vivid and real in this type of work with its absorbing interest and its constant reward, in the knowledge that every moment spent is worth while. A recent week-end stands out prominently, since it exemplifies all the aims of this program. From daily calendar notes, I quote:

*Saturday:* At last the date arrived for Mrs. Y's cesarean section. She is 29 years old and of three term pregnancies, lost three babies, first two by mutilating deliveries from below and the third by cesarean section. She intended to deliver this one at home by midwife. Had she gone to term no doubt the old uterine scar would have ruptured. Operated today, she has a live seven pound baby girl. Both are doing well tonight.

*Sunday:* Watched Mrs. Mc. last night. She delivered this morning at  $6\frac{1}{2}$  months in spite of all efforts to stop labor. Dr. S. was there and we have a live  $2\frac{1}{2}$  pound baby, thanks to Dr. G., the pediatrician, and the pulmotor from the fire department. The baby has a chance, using the WPA incubator we use in the home.

*Monday:* Labor Day. Called at 7:00 A.M. by Dr. S. at Muldrow, 77 miles from here. He diagnosed a placenta praevia in an old multipara. Luckily I brought the

microscope, blood transfusion outfit and typing sera, to say nothing of a nurse. Found a 38 year old mother with an abruptio placenta and dead baby. His hospital is small and poorly equipped. We found a compatible donor and taught Dr. S. how to type blood. He hopes to buy a microscope soon. After eight hours spent with Dr. S. we have a live mother, though the baby was born dead. Seven hundred and fifty cubic centimeters of blood were given her. Dr. S. now requests a conference in his hospital for his patients. On the way home stopped in to see Mrs. Y., the section. Both she and

yesterday's premature are doing well. All the happiness in the world can't compare with hers. She finally has a live baby out of four pregnancies. She just lies there and smiles at the world.

And Mrs. Y's smile more than compensates for the many miles driven to the little clinic at Qualls, for after all what is worth more to a maternal and child health program, or to any community than a live mother and a live baby?

# Medical and Dental Services for Dependent Children Under Public and Private Child Caring Agencies\*

LAWRENCE C. COLE

*Executive Secretary, Cleveland Children's Bureau, Cleveland, Ohio*

IN every community there are groups of dependent and neglected children, either with no parents whatever or with parents inadequate to provide them the essentials of normal home life, who require community care and protection. Experience has shown one of the prime essentials for the development of any child is adequate medical and dental care. Accordingly, the community standing *in loco parentis* to these children has the obligation to meet this essential need.

This obligation in different communities, dependent on standards of care and organization, is met in varying ways. The earliest stage was the use of the child's own physician with special blanks to be returned to the agency. This in turn gave way to the volunteer physician serving the agency. However, increased emphasis on higher medical standards and increasing numbers of children have forced the children's agencies in most large communities to replace the volunteer with a salaried physician or to develop a special medical program of its own. Today, most of the major child placing agencies of the country are using the regular out-

patient clinics of the hospitals for examinations and for treatment of their children. However, the free hospital dispensaries are primarily geared to care of the sick child rather than the preventive program for the well child needed by a children's agency. The tremendous amount of waiting time in clinics and the inability to secure adequate reports, have caused this arrangement in turn to give way in some cities to a specialized set-up for the child placing services.

Boston pioneered and there was early established in the Boston Dispensary a joint clinic called the "Preventive Clinic" for the children of the Children's Aid Association, the Church Home Society, and the Children's Friend Society. Philadelphia, likewise, has had for a number of years a clinic located in the Children's Hospital financed jointly by the Children's Bureau, the Pennsylvania Children's Aid Society, and the Society for the Prevention of Cruelty to Children, which has rendered medical examination and service to their children. The Buffalo Children's Aid Society for a time operated a medical and psychological clinic in one of their own buildings, later transferring it to the Children's Hospital where special medical and psychiatric services were available.

\* Read before the Maternal and Child Health Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

However, in all of these pioneering experiments, the services were primarily only given the child placing agencies for placement in foster homes. They were always a private agency service and not community-wide. There has been some question how closely their services integrated into the hospitals with which they were associated.

Cleveland, we believe, has pioneered in the development from two angles—first, the development of a broad community medical program for all children placed outside their own homes and including the bulk of the institutions in this service; second, the development of a public child care service with increasingly more adequate public funds for high grade medical and dental care of children under both public and private auspices, a plan initiated and financed at first under private auspices.

#### ORGANIZATION OF THE CLEVELAND CHILDREN'S BUREAU CLINIC

The Cleveland Children's Bureau Clinic was organized in July, 1923, as a special department of the dispensary of Lakeside Hospital to afford more ample medical care to dependent children admitted to institutions or placed in foster homes. Provision was made also for dental care at Lakeside Hospital Dispensary and in several of the institutions coöperating with the Children's Bureau. The hospital furnishes the rent, light, heat, telephone, laboratory and consultation services, and the Children's Bureau furnishes the staff, supplies and equipment.

The clinic originally was organized to give medical attention to all dependent children cared for in institutions through the Children's Bureau and all children over 3 years of age cared for in foster homes under the Humane Society. With the development of the Cuyahoga County Child Welfare Board in 1932, children coming under the care of this board also have been serviced

through the central clinic. Since May, 1931, the medical service in subsidized homes and the special infant clinic of the Humane Society was absorbed and children under 3 years of age of all three agencies are now examined in a special infant welfare clinic held during the morning. The dental clinic for dependent children has been operating continuously at Lakeside Hospital since January, 1924. The institutional services likewise have been expanded to include many of the newer preventive measures.

#### SERVICES RENDERED BY THE CLINIC

The activities of the Children's Bureau Clinic may be described as follows:

##### *A. Clinics for Older Children (afternoon)*

1. Preliminary physical examinations are given all children placed in institutions, boarding homes, or supervised in their own homes. Further examination when indicated is given in one or more special clinics of the University hospitals. Wassermann, tuberculin, and throat cultures are routine in these cases. Vaginal smears are made on all girls going to institutions and in other cases when indicated. In institutional cases, recommendations are made for the correction or follow-up of any defects found. The institution involved has the responsibility of securing care through their own dispensary relationships or return to the Children's Bureau Clinic for service in that clinic or other departments of the University hospitals. In all other cases than institutional further care is given in the clinic or other departments of the University hospitals, in-patient or out-patient.

2. Routine physical examination on all cases in boarding homes or supervised in own home; 3 months interval on children 15 months to 3 years; 6 months interval on children 3 to 6 years; yearly thereafter except where condition warrants more frequent check-up. Formerly, routine examinations were given every 6 months on all children, but the pressures of the clinic were so great that service had to be reduced to a yearly examination, except where more frequent service was indicated.

3. Care of ambulatory medical cases. Other cases (surgical, gastric, cardiac, etc.) are referred to the various specialized clinics in

the hospital. Thus a single visit of a child will permit not only the initial examination but contact with specialized clinics of the hospital, thus saving time and effort of the case workers. Transportation of workers and children can be centralized and time saved.

4. Study of special cases such as endocrine, etc., in association with the specialized clinics of the University hospitals is of unestimable value. Cases for special study as requested by the Child Guidance Center are cleared. A closer interrelationship of psychiatric and medical clinics would be of much value.

### *B. The Infant Clinic for Babies under 3 Years (three mornings a week)*

1. Preliminary examination including Wassermann and tuberculin tests. Infants are referred to the various health centers for follow-up until 15 months old, unless in need of special feeding or other care. Immunization against diphtheria and smallpox usually performed in health center. In case of illness, infants are referred back to the clinic.

2. Infants and children too sick to come to the clinic are seen by city or private physician. As children are placed all over northern Ohio, care of the children in outlying communities has been developed, one qualified physician being selected in each community to look after all the local children. This has proved much more satisfactory, and affords better medical care than the former method of allowing the foster parents to call their own family physician. Standardized procedures and costs have thus been developed for children in outlying areas without requiring costly transportation into Cleveland. The Medical Director of the clinic has carried a large share in the development of these local units.

3. An evaluation procedure for adoption has been developed. It is of tremendous value to the child placing agencies. A special arrangement has likewise been developed for medical examinations of prospective adoptive parents at the parents' own cost.

### *C. Dental Services*

The Dental Clinic with 15 3 hour periods a week is one of the few dental services available to dependents in the community, and is constantly being urged to extend its services to other than agency children. At the present time it is far overcrowded. Service includes complete mouth examination, simple prophylaxis, and the filling of pits and necessary fissures, extractions when necessary, but cannot provide orthodontia.

### *D. Services to Institutions Caring for Children*

The clinic, through the services of its three physicians, has set standards for institutional medical care of children. Service is offered in the institutions for routine physical examination of all children once or twice yearly, cases being referred to University and other hospitals for remedial defects. There has been developed a series of immunization measures which has been a tremendous factor in preventing quarantine and tying up of the institutions at high cost or for long periods. Immunizations are given twice yearly for diphtheria and scarlet fever, smallpox, etc. Tuberculin tests are repeated and consultation is offered on special cases. In some instances complete medical service is offered, and in others the physicians are available on sick call, while a few institutions have their own adequate medical set-up on a paid basis.

### *E. Subsidized Boarding Homes*

Visits are made twice weekly to agency subsidized boarding homes. These homes provide placement of selected children in need of close supervision, chiefly new-born infants, who are examined weekly. Difficult feeding cases are kept until adjusted and showing satisfactory progress. Other cases are kept for varying periods depending on turnover, etc.

### STAFF AND BUDGET

At the present time the staff consists of the following: a medical director and assistant, both men trained in pediatrics, and a woman physician, all part-time; a medical social worker and 2 clerks, full-time. Dental service is provided by 4 part-time dentists. The 1940 budget is approximately \$16,200, of which the private agencies, the Children's Bureau, and Humane Society, pay \$4,100 each and the public, Cuyahoga County Child Welfare Board, \$8,000. The University hospital, in the services it provides, likewise makes a considerable contribution. As the number of children under public care has increased, the effort is constantly being made to increase the proportion from public funds so that they will carry a share proportionate to the ratio of their number of children.



At the present time the private agencies, both from the children's field and the hospital, are carrying too large a share and the public ratio should be increased. Due to the shortage of public funds the increased proportion granted each year has been slowly increasing, but they are not yet bearing their full share. On the other hand, the private group has thus been instrumental in carrying over high grade medical service to the public agency. During the year approximately 3,000 children passed through the older children and the baby medical clinics, and approximately 2,000 were cared for in the dental clinic.

#### ADMINISTRATION OF THE CHILDREN'S BUREAU CLINICS

The responsibility for the administrative control of the clinic rests in a coöperative committee called "The Administrative Committee." The chairman, since its initiation, has been the Chief of Pediatrics at University Hospitals, on the faculty of the School of Medicine, City Hospital, and with many other community relationships. The vice-chairman has usually been the assistant superintendent of University Hospitals. Other members include the executives of the three children's agencies involved, the chief of Social Service of University Hospitals, the Dean of the Dental School, the executive of the Child Health Association, certain socially minded physicians, and representatives of the Protestant and Catholic institutions. This committee has been responsible for relationships, for the budget, and general administrative control. In recent years a subcommittee called "The Working Committee," has met regularly each month to discuss the actual internal operations. This committee has been composed of two representatives of each of the three placing agencies

financing the clinic, the Director of Social Service of the hospital, director of medical social work of the School of Applied Social Sciences, etc. The executive direction of the staff and the responsibility for finances have been carried by the Executive Secretary of the Children's Bureau. Supervision of the medical staff has been under the Chief of Pediatrics of University Hospitals, and the medical social work has been supervised by the Chief of Social Service of the hospital.

#### ADVANTAGES

The advantages of the centralized set-up have been as follows:

1. There has been developed a community program for children in foster homes and in institutions, which provides continuity of medical service, regardless of the type of care the child needs.

2. It has made available high grade medical service through its relationships with University Hospitals. This has been done at a minimum cost because of the centralized plant and competent direction.

3. It has made available to the child placing agencies a specialized service based on the individual child's needs so that his placement may be adapted in the very best way possible. Time of the children's workers is conserved by the special arrangements possible, securing of the specialized reports, centralization of transportation, etc.

4. It has extended the high medical standards developed by the private agencies to the newly formed public children's agency. The private agencies thus demonstrated a service which has now been made available to public children at low cost.

5. Through the coördination of public and private child care, with a progressive outpatient department of a teaching hospital, an understanding of the point of view and needs of both fields has been made possible, and accordingly better service given to all concerned.

It accordingly has been a demonstration of both community and inter-agency coöperation serving the best interests of the child and the community.

# The Slossfield Health Center\*

An Example of Local Medical Service for Mothers and Children  
Under Public Health Auspices

WALTER H. MADDUX, M.D.

*Slossfield Medical Center, Birmingham, Ala.*

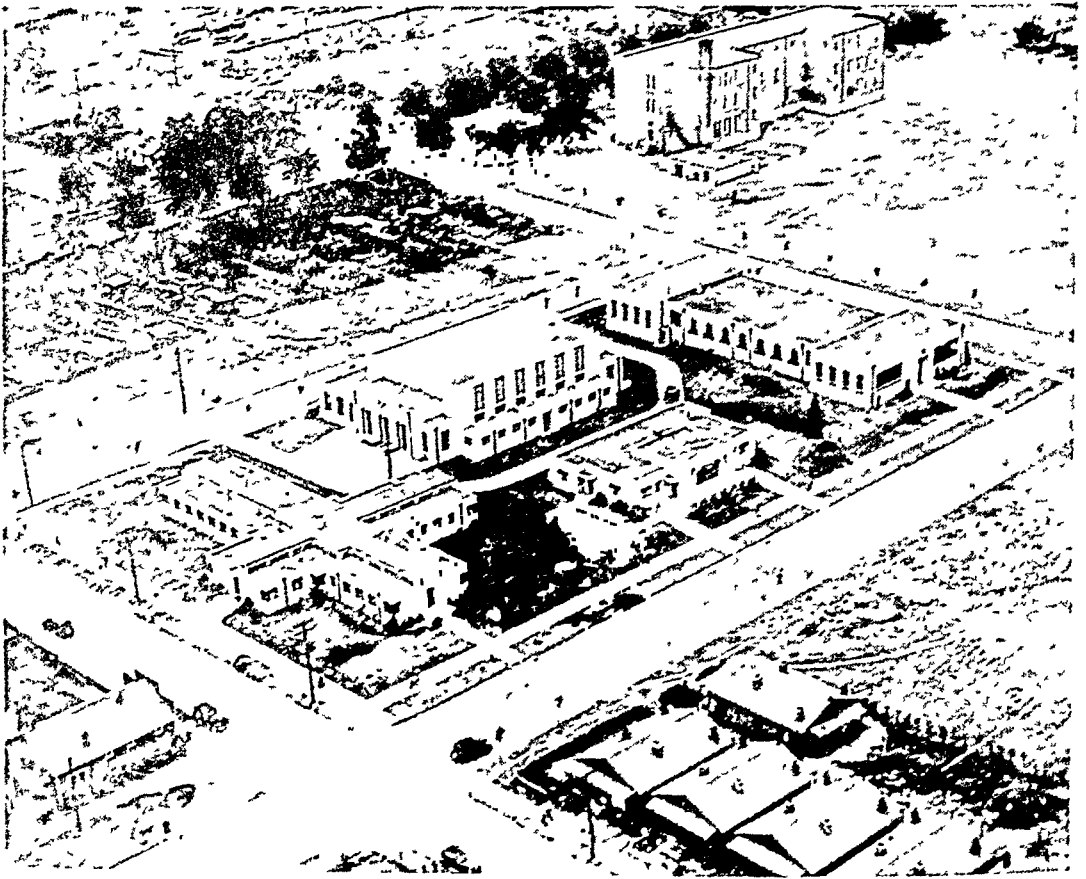
THE Slossfield Health Center, an integral part of the Slossfield Community Center in Birmingham, Ala., was opened July 1, 1939, by the Jefferson County Board of Health with the coöperation of other agencies, to provide for Negroes living in a specified area, maternity and child health services, a tuberculosis control program, and diagnostic and therapeutic care to persons with venereal diseases. It is estimated that 50,000 Negroes, approximately half of the Negro population of Birmingham, live within the area served by the center.

The Slossfield Community Center is an outgrowth of the industrial health plan of the American Cast Iron Pipe Company organized 18 years ago to serve the health needs of the workers and their families. About 2 years ago, having become convinced of the advantages of this health plan to the workers and of the great needs of the Negroes in the neighborhood of the plant for similar health and medical service and for educational and recreational opportunities, the president of the company, in coöperation with city and state authorities, developed a plan for a community center which should serve all these needs of the people. To

start it off, the city of Birmingham gave a tract of land at the price of moving the city stables. The Works Projects Administration constructed buildings for the health and maternity clinics and for the education and recreation centers; the National Youth Administration provided personnel for the educational and recreational activities; the Jefferson County Board of Health made provision for maternal and child health and venereal disease clinics; the Jefferson County Anti-Tuberculosis Association and its Negro subsidiary, the Birmingham Health Association, made provision for tuberculosis control clinics; the Julius Rosenwald Fund provided funds to equip the health center and to train personnel; the Alabama State Department of Health made available Social Security funds to pay physicians for clinic work and later additional maternal and child health funds to provide staff and equipment for the maternity clinic; the Children's Bureau lent a Negro pediatrician from its staff to be medical director of the health center.

From its inception the health center has been an essential part of a Negro community development in which the people of the neighborhood take pride, and give their support in many practical ways developed through National Youth Administration projects and through other local activities. Financial aid for many "extras" comes from

\* Read before the Maternal and Child Health Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.



LAYOUT OF THE WHOLE COMMUNITY CENTER, WITH THE HEALTH CENTER ON THE LEFT, THE MATERNITY CLINIC IN THE FOREGROUND, THE RECREATION AND EDUCATION BUILDINGS IN THE BACKGROUND AND ON THE RIGHT

a local community chest supported by Negroes of the area.

The health center originally occupied 28 rooms in one building, using them for health and medical education, for clinics of several types, and for maternal and child health conferences. Today it occupies an additional 11 rooms in a second building equipped as a maternity unit, including provision for delivery care and a nursery for care of new-born infants.

#### CLINIC ACTIVITIES

The clinic activities at Slossfield Health Center follow closely the general outline of purpose defined by the Jefferson County Board of Health; namely, to supply certain medical services; to coordinate the health activities

of official and voluntary agencies through coöperative planning; and to develop graduate education and training for practising physicians and health education for members of the community.

In 1937 the area now served by the center had but one clinic period for prenatal service and one for child health each week. A syphilis clinic was opened in January, 1939. The Slossfield Health Center was opened July 1, 1939, and expanded service began. In response to gradual development of demand, the center now provides a total of 21 clinic periods during the week, including those for prenatal care, medical diagnosis, child health, dental care, venereal disease treatment, and tuberculosis. The number of persons

attending the various clinics has increased until recently in a single week it reached nearly 500 persons.

The requirements for admission to the center, as established by the Jefferson County Board of Health, are legal residence and inability to pay for private medical services.

The interview for admission is conducted by the medical social worker and may result in sending the individual to a private physician or in laying the groundwork for effective relationships between the health center and the patient. The medical social worker denies advice to no one, but is always circumspect in determining eligibility for clinic services. Controversy with practising physicians in regard to clinic admissions is almost unknown at Slossfield Health Center.

The medical staff consists of the full-time medical director, who is a pediatrician, 4 senior medical consultants who are white physicians, 8 Negro clinicians paid \$5 per 2 hour clinic period (*venereal disease* or *maternal and child health*) by the Jefferson County Board of Health. There are, in addition, 1 Negro junior obstetric consultant and 29 other persons, all Negro, who assist in operating the health center. These include a dentist, a medical social worker, a resident supervisory nurse, 6 public health nurses scheduled to assist at clinics as part of their general community services, and a clerk. The rest of the staff are supplied by the Work Projects Administration and the National Youth Administration.

The tuberculosis clinic is operated by the Jefferson County Anti-Tuberculosis Association and the Birmingham Health Association. In addition to the senior consultant in tuberculosis and 2 Negro clinicians, 6 workers are provided for this clinic by the Work Projects Administration.

The medical clinic is diagnostic and

serves primarily to discover cases of syphilis. Patients who are found to be non-syphilitic but who need treatment for other conditions are referred elsewhere.

The consultant in pediatrics holds clinic sessions for infant feeding, for pediatric diagnosis, and for immunizations. An average of 30 children are seen by the consultant and the general practitioner at each session.

Because of the unpredictable course of apparently minor ailments in children and for educational purposes, individual appointments are made for sick children. Specific instructions are given for each sick child, or he is referred to the proper source for treatment.

A dentist is in regular attendance 2 hours daily with an added hour on Saturday, the period for children. Children and prenatal patients receive particular attention, and hygiene and prophylaxis are emphasized.

#### MATERNITY DELIVERY SERVICE

On May 12, 1940, the new maternity delivery service was opened at Slossfield Health Center. The ward has 8 beds for maternity patients; there are also 2 beds for isolated patients, and a nursery for the new-born infants. The maternity service is now the most complete service at the center. It offers prenatal care, delivery at home or in the maternity unit, postnatal care, and—under the supervision of the consultant in pediatrics—care of new-born infants.

The staff of the maternity service is composed of the senior consultant in obstetrics, the junior consultant who has had advanced obstetric training, and 7 nurses. The senior consultant determines and directs all obstetric practice under the general administrative direction of the county health officer. There are 23 Negro physicians in the Birmingham area. Of these, 15 are in active practice and available for serv-

ice at the maternity clinic. Two general practitioners are paid to assist at the prenatal clinics. Of the Negro physicians who are eligible for services, those wishing to participate in the delivery program are scheduled in pairs for home and maternity center deliveries in rotation, and receive instruction and a fee of \$10 for each delivery if followed by complete postnatal care.

Physicians may refer their part-pay obstetric patients to the center for prenatal care and receive medical reports for their guidance in delivering the patients in their homes. The public health nursing service directs women to the center as soon as they are known to be pregnant. During a 5 day period in August, 13 new prenatal patients were admitted. Six of these, who came on their own initiative, were less than 4 months pregnant.

In the prenatal services the physicians at the clinic and the nurses, both in the center and during home visits, instruct the expectant mother on health practices, diet, preparations for the delivery, and infant care. Much of this instruction is accomplished by the nurses in demonstrations at prenatal classes held preceding the regular examination.

Prenatal medical examinations are conducted by the obstetric consultant as teacher, the junior consultant, and the general practitioner. About 30 patients are examined at a clinic session. Whether delivery is to be at home or at the maternity center is determined by the senior consultant, primarily on the basis of prenatal medical factors relating, in the main, to the needs of primiparas and apparent complications of multiparas. The senior obstetrician also acts as consultant for all maternity center deliveries, and is on call by the junior consultant obstetrician for home deliveries. The center does not afford facilities for major operative procedure.

The home delivery team includes the junior consultant, the general practitioner assigned to the case, and the nurse assigned to home delivery service.

By August 13, 3 months after the delivery service was opened, 231 patients had been scheduled for delivery through the prenatal service which the delivery service complements. Of these 231 patients, 133 (58 per cent) are scheduled for home delivery, and 82 (35 per cent) for delivery at the maternity center. For the remaining 16 patients, the place of delivery is un-



MEMBER OF HOME DELIVERY TEAM

specified, no positive diagnosis has been reached, or delivery is provided for elsewhere.

#### GRADUATE MEDICAL TRAINING

Slossfield Health Center is unique in that all its services are associated in the idea and practice of extending graduate medical training to Negro physicians. The obstetric training, nowhere else available to them on this scale, is a studious concern of all Negro physicians of Jefferson County and is of real interest to Negro physicians in other places. Dr. Baker, State Health Officer, and Dr. Dowling, Jefferson County Health Officer, envisage the possibility of offering the facilities and teaching program of Slossfield Health Center to all the Negro physicians of Alabama.

The teaching relationship of the 4 senior consultants—in obstetrics, pediatrics, venereal diseases, and tuberculosis—with staff and general practitioners is largely on the basis of direct, individual case instruction. In addition each consultant voluntarily conducts *one didactic period a month*. Experience in major operative procedures is the only type of obstetric training not offered to our Negro physicians.

During August and September, 1940, the county health officer made available at the center a series of graduate medical lectures and consultations given by the staff of Tulane University Medical School under the sponsorship of the Commonwealth Fund.

All Negro physicians and dentists in the Birmingham area are invited to visit the clinics held at the health center and may attend all its educational programs. It has been possible to conduct the graduate education program without charge to these physicians and dentists.

The response of the Negro physicians to all educational opportunities has been commendable. The offer of

the conference room at the health center for the regular monthly meetings of the local Negro medical association has brought all medical meetings of the Negro physicians to the Slossfield Health Center during the past year. Beginning this fall, the Negro dentists will hold their regular meetings there also.

#### HEALTH EDUCATION

The planned approach to health education in the community is through the efforts of the special staff of the Jefferson County Board of Health and through the Jefferson County Anti-Tuberculosis Association and its subsidiary, the Birmingham Health Association. As a result, Negroes of this area are becoming increasingly aware of ill health in members of the family before disease reaches an advanced stage, and come voluntarily to the health center for advice and treatment before hospitalization becomes necessary.

The Jefferson County and Birmingham City public health nursing departments discover many Negroes who need health advice and direct them to the center, particularly to the prenatal and child health clinics. Their activity in this respect cannot be overemphasized for it has value in educating the individual and in rendering medical service. Patients also come to the center referred by practising physicians, employers, welfare agencies, and medical institutions.

We believe a factor of value to both patient and clinic is the effort to dispel apprehension and establish ease and directness in patient-physician relationship. The way is then prepared for successful health education. The health and medical problems of our patients are frequently much involved with other problems and do not offer themselves to solution by a purely medical formula. The lack of information, misinforma-

tion, poverty, and difficult adjustments which characterize the patients in varying degrees must be visualized by our medical and nursing attendants. The medical social worker does much to bring about an understanding of these factors.

#### THE FUTURE

The plan for the development of the health center is not yet complete; more clinics need to be added. It is moving forward steadily, however, and is

making a place for itself in the life of the community which is of unquestioned value, and which will be measured in terms of health and well-being among the women and children and workers of the area. A considerable part of the success of the health center, however, may be accorded to the fact that it is a unit of service in a broad community development concerned with educational and recreational opportunities as well as health and medical care.

# Proposed Method for the Bacteriological Examination of Flat Surfaces\*

WILLIAM G. WALTER AND G. J. HUCKER, PH.D., F.A.P.H.A.

*New York State Agricultural Experiment Station, Geneva, N. Y.*

THE development of modern sanitation methods in food and dairy plants has emphasized a need for a procedure which would allow the determination of numbers and types of organisms on flat, hard surfaces. Attempts have been made to develop such procedures but the results have not been entirely satisfactory.

Not only in food and dairy production plants has there been a need for a simple bacteriological test for this purpose, but more recently in the field of food dispensing, particularly in different types of eating establishments. In the latter case there has been a growing need for a procedure which could be used to determine quickly the degree of contamination on the surface of eating utensils. A review of the literature has revealed that various modifications of the swabbing technic have been most widely used in the bacteriological examination of eating utensils, and, in the dairy industry, an agar-disc method described by Hammer and Olson<sup>1</sup> has shown considerable promise as a means of determining the contamination of dairy equipment.

Different swabbing technics have been employed in making field tests in eating establishments, but it was felt that a more rapid and simple method was needed for determining the extent of contamination on flat surfaces. Since the swabbing methods require considerable equipment and technically trained personnel, they are not practical for most routine field work.

*The Contact Plate*—A modification of the agar-disc method proposed by Hammer and Olson<sup>1</sup> has been developed and has been termed the "contact plate" method. The preparation of contact plates is as follows:

1. Clean No. 2 ( $3\frac{7}{16}$ " in diameter) can covers whose concentric ridges have been flattened, are placed in clean Petri dishes so that the outside or top of the cover faces the bottom of the Petri dish.

2. The Petri dish and tin cover are sterilized in the hot air oven.

3. The sterilized Petri dish is inverted and the bottom of the dish raised by means of a suction cup, such as is used on automobile windshields to hold a heater in place, so that 16-17 ml. of the new standard agar can be pipetted into the tin cover and allowed to spread in an even layer.

4. The contact plates are then stored at a low temperature (below 7.5° C.) to retard drying and with the Petri dish cover up, to decrease the possibility of contamination. For best results these plates should be used within 3 weeks.

Tests with the contact plate on a flat surface are made as follows:

\* Read at a Joint Session of the Michigan Association of Sanitarians and the Laboratory, Engineering, and Food and Nutrition Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940. Approved by the Director of the New York State Agricultural Experiment Station for publication as Journal Paper No. 421, January 3, 1941.



TABLE 1

*Counts Obtained by Consecutive Contact Plate Tests on a Selected Area of a Single Dinner Plate*

Plate Number	Contact Plate Examinations						Total Counts	Per cent Obtained by First Contact Plate
	I	II	III	IV	V	VI		
1	12	6	14	6	4	4	46	26
2	90	39	16	5	10	10	170	53
3	75	50	20	14	10	13	182	41
4	115	147	25	23	19	12	341	34
5	245	50	25	20	18	12	370	66
6	122	7	8	6	7	7	157	78
7	232	163	8	20	25	15	463	50
8	50	25	30	32	10	24	171	29
9	16	4	14	1	0	0	35	41
10	15	15	10	5	5	5	55	27
11	181	130	92	74	52	.	529	34

1. The upright Petri dish containing the contact plate is placed near the surface to be tested.

2. The top of the Petri dish is removed and the contact plate is removed by means of the suction cup.

3. Examination of the agar surface will reveal the presence of contaminants and the depth of the agar layer, *i.e.*, whether it is above or below the level of the edge of the cover.

4. The contact plate is then placed on the surface to be tested and a slight pressure applied. If the surface of the agar is level or slightly above the edge of the cover, very little pressure is required; if it is below, more pressure should be exerted. However, if too great a pressure is applied, the agar may stick to the tested surface when the tin cover is removed. A contact period of approximately 4 seconds is given.

5. The contact plate is returned to the Petri dish and incubated at 32° C.

6. Whether or not a satisfactory contact has been made with the surface can be determined immediately after making a test by observing the tested area. A visible moist spot gives a good indication of the extent of the surface that has been in close contact with the agar.

#### RESULTS AND DISCUSSION

Six consecutive contact plates were tested on selected areas of 44 china dinner plates. It was found (Table 1) that approximately 44 per cent of the total number of colonies recovered by the 6 contact plates were picked up in one series of tests by the first contact made. In other words, approximately

one-half of the organisms were removed by the first contact.

A similar distribution or pattern of organisms was often found on successive contact plates. This would indicate that some of the organisms on the dinner plates existed as colonies from which a number of cells were probably removed with each contact plate test that was made, or that minute particles of food were present which had numerous organisms on the surfaces. This would indicate also that a larger percentage of organisms was recovered by the first contact plate test than shown by the calculation, since the same colony would frequently contribute to the counts of succeeding tests.



FIGURE 1—Removing contact plate from Petri dish prior to making a test on a dinner plate

About 50 field tests have shown that the contact plate is very useful in obtaining an indication of existing contamination on flat surfaced eating utensils prior to their use in food establishments. The simplicity of the method and the minimum amount of equipment necessary for the procedure have been a great asset in making tests in these establishments during busy periods of serving.

*Relation of Counts Obtained by the Contact Plate Method and Various Swabbing Methods*—Approximately 250 china plates were tested to compare the contact plate method with a slight modification of the swabbing technic proposed by Fellers, Levine, and Harvey.<sup>2</sup> These workers used a saline solution in the dilution tube and a wooden applicator swab. It was found that the contact plate consistently recovered more organisms from the surface of a plate than did this swab method.

The swabbing method proposed in the New York State Sanitary Code<sup>3</sup> was compared with the contact plate technic. This swabbing method differed from the wooden swab technic in that wire applicators were used in the swabs, a phosphate buffer instead of a saline solution was employed in the dilution tubes, and the dilution tubes containing the swabs

were agitated more thoroughly before removing the swab prior to plating an aliquot sample.

It was found that in general the contact plate method recovered more organisms than did a flexible wire swab, testing an equivalent area on the same plate. However, when a stiff wire (63 gauge) swab was employed in testing approximately 40 plates, consistently higher counts were obtained than by the contact plate method (Table 2).

Finding that the stiff wire swab generally recovered more organisms than did the flexible wire swab, 12 tests were made in which the wooden swab method was compared with the stiff wire swab method. It was found (Table 3) that with one exception, more organisms were recovered by the stiff wire swab method.

These experiments indicate that the type of applicator used in the swab, the kind of solution used in the dilution tube, and the extent of shaking the tube before removing a sample are factors warranting consideration when employing a swabbing method for obtaining total counts.

Two possible explanations might account for the consistently higher counts obtained by the stiff wire swab method than by the contact plate method

TABLE 2

*Comparison of Counts Obtained on the Same Plate Using the Stiff Wire Swab Method and the Contact Plate Method*

Plate Number	Series A		Series B		Series C	
	Wire Swab	Contact Plate	Wire Swab	Contact Plate	Wire Swab	Contact Plate
1	416	115	432	65	248	agar stuck
2	300	101	372	68	100	243
3	280	176	60	21	20	8
4	464	115	160	67	32	7
5	72	5	600	64	148	4
6	388	30	3,860	165	1,712	140
7	84	37	748	too many	196	28
8	1,104	50	3,250	110	112	30
9	1,284	141	2,850	520	408	24
10	344	20	928	500	216	70
11	556	110	96	596	4,220	16
12	...	...	2,080	524	1,336	11
13	...	...	416	50	...	...
14	...	...	6,460	600	...	...
15	...	...	6,000	600	..	...

TABLE 3

Comparison of Petri Plate Counts Obtained from Dinner Plates by the Wooden Swab Method and the Stiff Wire Swab Method

Petri Plate Counts from Equivalent Areas Swabbed

Plate Number	Series A		Series B	
	Wooden Swab	Wire Swab	Wooden Swab	Wire Swab
1	69	268	138	867
2	25	116	115	216
3	48	268	spreader	104
4	61	632	47	96
5	420	256	320	too many
6	29	336	500	1,336

(Table 2). First, this type of swab insured a more thorough physical removal of organisms from the swabbed area and, second, the shaking of these swabs in the dilution tubes broke up the clumps of bacteria, resulting in a higher count on subsequent plating than when a contact plate test was made which would show only a single colony for each cell or colony that was touched.

The stiff wire swab method has its place where a total bacterial count is desired and where time and amount of equipment are not the primary factors to be considered. The contact plate method likewise has an important place in sanitary control work. The simplicity and ease with which this latter method can be used in field tests to obtain an indication of the extent of contamination on flat surfaces has been noted on numerous occasions. The speed with which the test can be performed has been of great asset when inspecting flat surfaced dishes in an eating establishment or the equipment in a dairy plant. The contact plate has been found useful in convincing food dispensing operators that the manner in which their dishes are washed has an important bearing on the type and number of organisms remaining on these utensils. Preliminary experiments have also shown the contact plate method to be feasible in determining whether flat surfaced dairy equipment has been cleaned properly.

The substitution of eosin-methylene-blue and Endo's agar for the new standard agar ordinarily used in the contact plate was found effective in differentiating colon organisms encountered on tested surfaces.

#### SUMMARY

1. A proposed method for studying the bacterial contamination on flat surfaces has been described.

2. The "Contact Plate" method has been compared with various swabbing technics and found to give consistently higher counts than either the wooden swab method or the flexible wire swab method.

3. The stiff wire swab method consistently gave higher counts than did the contact plate method. Possible explanations for this fact are mentioned.

4. The minimum amount of time and equipment required and the ease with which the test can be performed, have shown the contact plate method to be more practical for field tests than any of the swabbing procedures employed.

5. The contact plate method has been found to be a simple and rapid means of determining the efficiency of dishwashing operations on flat surfaced utensils.

#### REFERENCES

1. Hammer, B. W., and Olson, H. C. Bacteriology of Butter III. A Method for Studying the Contamination from Churns. *Iowa Agri. Expt. Sta. Bull. No. 141*, Ames, Iowa, 1931.
2. Fellers, C. R., Levine, A. S., and Harvey, E. W. Bacteriological Examination of Glassware or China for Sanitary Quality. *A.J.P.H.*, 26:1211-14, 1936.
3. New York State Department of Health. Methods for Examinations Concerned with Eating, Drinking and Cooling Utensils. *Sanitary Code*, Chap. XIV, Regulation 3, 1932.

# Enforcement of Dishwashing Regulations Applying to Eating and Drinking Establishments\*

WALTER VON DOHLEN TIEDEMAN, M.C.E., F.A.P.H.A.  
*New York State Department of Health, Albany, N. Y.*

TALK to the man on the street about dishwashing and more than likely you will find yourself listening to a tale about his personal experience with greasy spoons and dirty glasses, or his observations of other filthy conditions in some public eating or drinking place. One man writes—"For a long time now I have refrained entirely from patronizing drinking fountains and lunch counters in this state because of the inexcusably filthy way in which eating utensils are washed and dried after use for further servings."

Lawmakers on the lookout to enact something to please the people back home and to accede to that familiar demand "there ought to be a law," have in many instances enacted laws governing the washing and sterilization of eating, drinking, and cooking utensils. In their zeal to see every living organism on dishes or glasses destroyed, health officials have been inclined to recommend what they believe to be "sure kill" methods in the drafting of these laws or in the enactment of regulations, with little regard for practicability which is so important to enforcement.

Our observations indicate that here the matter rests in many but not all communities. Either the health officials recognize that the regulations are practically unenforceable and stop there, or depending upon inspection alone they see that certain equipment is provided and rest in the belief that great things are being accomplished. However, in many instances this belief cannot be substantiated by bacteriological examination of dishes and glasses ready for use. As an example of this, in one city sterilization by hot air for 5 minutes is required. Most operators complied by purchasing a certain type of heat regulated hot air oven. The proposition sounded good. The temperature was maintained at 250° F., and batches of glasses were inserted for 5 minutes' treatment. A test of this sterilizer showed that it took about an hour for a full load of heavy glassware to reach 250° F. When this tray of glasses was removed and another tray of glasses at room temperature was inserted in the preheated sterilizer these glasses reached only body temperature in the 5 minutes prescribed for treatment.

Experience in this and other fields has convinced us that the type of regulation simply prescribing the result to be obtained is more readily enforceable, is considered by operators as being more reasonable, and is more likely to get

\* Read at a Joint Session of the Laboratory, Engineering, and Food and Nutrition Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

results than one specifying the method or methods of disinfection that must be used. This is particularly true if compliance is to be determined by laboratory tests.

Ordinances that specify methods are likely to be impractical because of the desire to do a thorough job. The people who draft such regulations generally have the adequacy of the treatment foremost in their minds rather than the practical conditions under which such methods are to be applied. For instance, many dishwashing machines which wash and rinse dishes in less than 2 minutes are in use in communities in which the regulations require sterilization of dishes by immersion in hot water for *not less* than 2 minutes.

The results of studies convince us that washing is fully as important as sterilization, for some methods of sterilization fail when applied to utensils having a greasy film, and controls have shown that practically all organisms are mechanically removed by washing in clean water containing a good detergent and rinsing with clean water not necessarily hot. After all, being given the task of freeing a utensil of living organisms, is it not as effective to flush them down the drain as it is to kill them *in situ*? Using a good detergent, satisfactory results can be obtained by washing utensils in clean water at not over 120° F. and by rinsing them in clean water thermostatically maintained at a temperature of 170° F. or more.

Detergents present an administrative problem if we are to use an educational approach to enforcement. When the inspector advises the use of a good detergent he is immediately going to be asked to give names. Until the inspector is in a position to tell which detergents are satisfactory for hand washing, for machine washing, and for hard or soft water, these products will continue to be sold and purchased largely on a price

basis. This means that concerns that make good detergents will sell poorer ones to meet price competition. It is possible to classify detergents by laboratory tests, and we believe that a broad classification such as excellent, good, and poor, or A, B, and C, can be made and published without favoring any one or two products.

All this assumes that the health official chooses to take an educational approach to enforcement. It is also essential that health officials make facts available concerning the use and procurement of simple equipment so necessary for small establishments to have for the proper washing and rinsing of dishes and glasses.

In this as in other fields, enforcement can be made easier and more effective by the judicious use of laboratory tests. An intelligent operator is much more likely to make desired improvements when informed that the dishes or glasses with which he is serving the public show excessive bacteria counts or the presence of coliform organisms than if he is told that the inspector does not like his equipment or the way he is doing things.

Laboratory work is expensive and time consuming, and therefore it must be used where the need is greatest. Fortunately we have developed some simple visual tests that can be applied by the inspector in the field. Such a device as the General Electric grease film viewer can be used to determine whether or not the rims of glasses are reasonably clean. Although the correlation between visible film and excessive bacteria count is not good, most regulations require washing as well as disinfection or sterilization or sanitization, and the film is at least evidence of unsatisfactory washing. For the examination of china for film as evidence of improper washing we are using powdered carbon applied by a camel's hair brush or, in other words, the finger print method.

When visual methods indicate that utensils are clean and the method used convinces the inspector that the utensils are being disinfected, little if any laboratory work is necessary. When the evidence shows the utensils to be clean but the inspector feels that the methods used are questionable, the swab rinse method of laboratory examination or other suitable method should be used to determine whether or not bacteria are present in excessive numbers, and whether coliform organisms are present. The results should be used to stimulate more effective processing.

In inaugurating a program of this kind every opportunity should be given operators to improve their methods and to learn what is expected of them. As soon as ample opportunity has been given for education, say 6 months or a year, punitive methods must be used both in fairness to the operators who have willingly complied with the requirements and in the interests of public health. It is suggested that legal actions be based on laboratory findings which generally constitute good evidence of violation.

We are convinced that small fair

concessions and other eating and drinking places without running water should be advised to use single service eating and drinking utensils. Of course, single service utensils have a broader field of usefulness than this. Some druggists and others find it more economical to use single service containers than to employ extra help to wash dishes and glasses.

Scoring methods and the use of placards as rewards for compliance have not been too successful according to our observations. This does not necessarily mean that they have no merit. If these methods are utilized they can be materially strengthened by using the reports of laboratory examinations of samples from washed and disinfected utensils as the principal element of the score or as the principal basis for awarding and withdrawing the placard.

When and if we reach the goal of effective enforcement of reasonable regulations requiring properly cleansed dishes in the rank and file of public eating and drinking places, it will be time enough to consider whether or not it is necessary and feasible to try to reach the ideal of surgical sterility.

## Minimum Qualifications for Nutritionists in Health Agencies\*

IN view of the great advance in the science of nutrition and the realization on the part of public health workers of the important rôle which nutrition of individuals plays in maintaining well-being, there is an increasing need for properly trained workers to carry on programs of nutrition education in the field of public health. The past few years have seen a marked increase in the employment of nutritionists by public health agencies in states, counties, and large municipalities. It is anticipated that many more of these agencies will be desiring nutrition services, thus increasing the demand for qualified, professionally trained nutritionists. For the most part the nutritionist serves as a consultant working through the staffs of all divisions of the health agency that are concerned with nutrition. When a large agency employs a number of nutritionists, the duties of the workers obviously vary widely from those of the supervisor to

those of the staff members working under close supervision. At present the most common type of position is that of a consultant who works under the administrative direction of the chief of a major division of the health agency and who is largely responsible for the technical content of her program. The qualifications set forth below apply to that type of position.

These qualifications have been prepared as an aid to: (1) colleges and universities training nutritionists and those arranging public health nutrition curricula, (2) municipal, state, and federal departments of civil service, (3) employers selecting nutritionists, and (4) individuals in guiding their preparation for service in this field. The purpose of this statement of qualifications is to serve as a guide for new appointments, but the importance of additional preparation for those already employed should not be minimized.

**I. Definition**—The nutritionist in a public health agency is a professionally qualified person who directs or carries on a program of activities dealing with the application of the scientific knowledge of nutrition to the prevention of disease and the promotion of positive health. The nutrition program of a health agency is directed toward strengthening the service that the agency is rendering in promoting well-being among groups and individuals in

\* Preliminary Report of the Subcommittee on the Educational Qualifications of Public Health Nutritionists.

This report conforms to a statement of the Joint Committee of the American Home Economics Association and the American Dietetic Association, dated July 23, 1940.

The Committee on Professional Education of the AFHEA publishes this report to permit the members and fellows of the Association to review it and to offer criticisms and suggestions in the further development of the report.

This report like all other statements of the committee on professional and technical qualifications in public health, is subject to periodical revision in order to take into account the best thought of the time.

the communities through better food practices.

*II. The general functions of the nutritionist in a health agency are—*

A. Participation in organizing and carrying out a program to prevent and control all dietary deficiency diseases and to improve health through promoting the production or selection, proper preparation, and preservation of the foods necessary for an adequate dietary. Such programs frequently call for the coöperation of the nutritionist with workers in medicine, dentistry, nursing, agriculture, extension service, education, and welfare.

B. Preparation and assembling of materials for nutrition education—

1. Technical and semi-technical materials for the use of professional workers on the following subjects: nutrition, food selection, food preparation, food economics, and racial, religious, and regional food customs.

2. Popular educational materials for the lay public on these subjects in the form of booklets and folders, posters and exhibits, news releases and radio broadcasts.

C. Staff education—Participation in the in-service training of physicians, dentists, public health nurses, dental hygienists, school health educators, school lunchroom managers, and social workers in regard to human food needs and ways of meeting these needs within the agricultural resources of the area or the purchasing power of the family, and methods of improving food practices through education.

D. Consultation services—

1. For workers in health or allied agencies in regard to dietary needs of individuals, families, and insti-

tutional groups, particularly those in institutions caring for children and the aged.

2. With individual cases referred by professional workers for intensive help in food and nutrition problems.

E. Group instruction of adults and children on food and nutrition in connection with health conferences or with the educational program of the health agencies in schools.

F. Coöperating with other agencies in the community in the preparation of budget standards in relation to local current prices. The particular contribution of the nutritionist is to provide for the nutritive needs of the area being served.

G. Preparation of food market orders at various cost levels but of adequate nutritive value, menu plans, and recipes for families and institutions. Similar services for therapeutic and other special diets recommended by physicians, in accordance with income and racial, religious, or regional food practices of the family.

H. Regional studies and surveys—

1. On cost, availability, and use of foods needed to furnish an adequate dietary, these to be used as guides for setting up nutrition programs.

2. On prevailing food practices in the entire region or on special groups.

3. On the effectiveness of various nutrition programs.

I. Interpretation of the nutrition program to professional workers and to the community.

J. Bringing about closer working relationships between the health agency and other agencies carrying on educational or service programs in nutrition.



### III. *Qualifications*—

A. Education — Human nutrition should be the subject of major interest.

1. A baccalaureate degree in home economics (one-quarter of the course credits in home economics) from a college or university with a major in foods and nutrition, or a bachelor's degree in other subjects, such as chemistry, biology, or education, with additional courses in foods, nutrition, and allied subjects equivalent to the requirements for a major in those fields for a bachelor's degree in home economics. The college work should include basic courses in chemistry, including physiological or biochemistry, physiology, bacteriology, economics, sociology, psychology and teaching methods, together with requisite courses in home economics, covering human nutrition, food selection, preparation and marketing, family budgeting and economics, and home management. Introductory courses in public health activities and in community organization and resources are necessary.

2. Satisfactory completion of the equivalent of at least one year of full-time graduate academic credit, chosen in relation to the previously mentioned basic training so as to qualify especially the worker for community nutrition participation in the public health field. This graduate work should include supplementary courses in human nutrition, and should give a working knowledge of the public health program and its administration, health education, community organizations and resources, child development, and social case work. The content and extent of graduate study required will vary according

to the type of undergraduate preparation and the interval since such work was completed. Completion of an accredited course in hospital dietetics is a most desirable addition to, but not a substitute for, the graduate work outlined above.

3. Field work in a nutrition program of a health or welfare agency under the supervision of a qualified nutritionist should be provided at either the graduate or the advanced undergraduate level.

### B. *Experience* \*—

1. Minimum of 2 years in the following positions:

a. Nutritionist in a health agency

b. Home economics trained worker conducting adult education program in food and nutrition (including extension workers)

c. Home economist in a public or private social welfare agency  
or

2. One year in the above (III,B,1) plus 2 years as any of the following:

a. Therapeutic or teaching hospital dietitian

b. Dietitian or nutritionist in a food clinic or child development center or a school

c. Teacher of nutrition in a college or normal school

d. Research worker in human nutrition

e. School lunchroom director—provided that person has carried

---

\* Candidate should have had part of training and experience indicated within 4 years of the time of her application.

on a nutrition educational program

C. Personal Qualifications—

1. Physical fitness
2. Executive and organizing ability

3. Ability to gain confidence and cooperation of fellow-workers and public

4. Skill in analysis of situations and in presentation of material.

COMMITTEE ON PROFESSIONAL EDUCATION

William P. Shepard, M.D., *Chairman*

Reginald M. Atwater, M.D., *Secretary*

Allen W. Freeman, M.D.

Edward S. Godfrey, Jr., M.D.

John E. Gordon, M.D.

Ira V. Hiscock, Sc.D.

Pearl McIver, R.N.

George H. Ramsey, M.D.

Wilson G. Smillie, M.D.

Ralph E. Tarbett, C.E.

Henry F. Vaughan, Dr.P.H.

E. L. Bishop, M.D.

W. S. Leathers, M.D.

John Sundwall, M.D.

} *Consultants*

SUBCOMMITTEE ON THE EDUCATIONAL QUALIFICATIONS  
OF PUBLIC HEALTH NUTRITIONISTS

Pearl McIver, R.N., *Chairman*

J. N. Baker, M.D.

Alice F. Blood, Ph.D.

Blanche Dimond

Marjorie M. Heseltine

Martha Koehne, Ph.D.

Lydia J. Roberts, Ph.D.

William H. Sebrell, Jr., M.D.

# Selection, Training, and Supervision of County Sanitarians in West Virginia\*

J. B. BAKER, H. K. GIDLEY, AND GILBERT L. KELSO

*Supervising Sanitarian; Associate Sanitary Engineer; and Sanitary Chemist in  
Charge of Training Sanitarians; West Virginia Department of Health,  
Charleston, W. Va.*

THE sanitation problems in West Virginia are more acute than in many states, and until the past few years death rates from typhoid fever and associated intestinal diseases have been much higher than the average for the United States Registration Area.

The major environmental sanitation problems in the state result from the chief industrial activity, the mining of bituminous coal. In general, the coal fields are in mountainous regions, and the rugged terrain causes an extremely heavy population to be concentrated in the confines of the narrow valleys. The numerous mining camps, varying in size from 1,000 to 3,000 population are usually without the improvements one would expect in a municipality of the same size. This is reflected in the incidence of certain diseases which are much higher in the mining areas, than in the non-mining areas.

Prior to 1936 only the most pressing local sanitation problems could be attacked due to limitation of personnel in state and local health departments. On

January 1, 1936, inadequately staffed full-time health units were operating in 13 of the state's 55 counties. Sanitary inspectors or engineers were employed in 8 of the units, but of the 11 men employed only 2 were qualified through training or experience for the specialized work they were doing. The experience with "sanitary inspectors," "sanitary officers," and "sanitary police" had not been favorable. With an occasional exception, the men employed in local health departments were selected because of political affiliation and were incapable of formulating and carrying out intelligent programs. The inspector's viewpoint was apt to be limited and his advice flavored with lay opinion in direct contradiction to sound public health practice. Too often the direction he received from the health officer was apt to be equally ineffective.

The release of federal funds under Title VI of the Social Security Act and an increased state appropriation for local health work in 1936 meant not only that county health work would be expanded, but that selection, training, and supervision of personnel could be undertaken. It is the purpose of this paper to discuss the procedure that has

---

\* Read before the Engineering Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

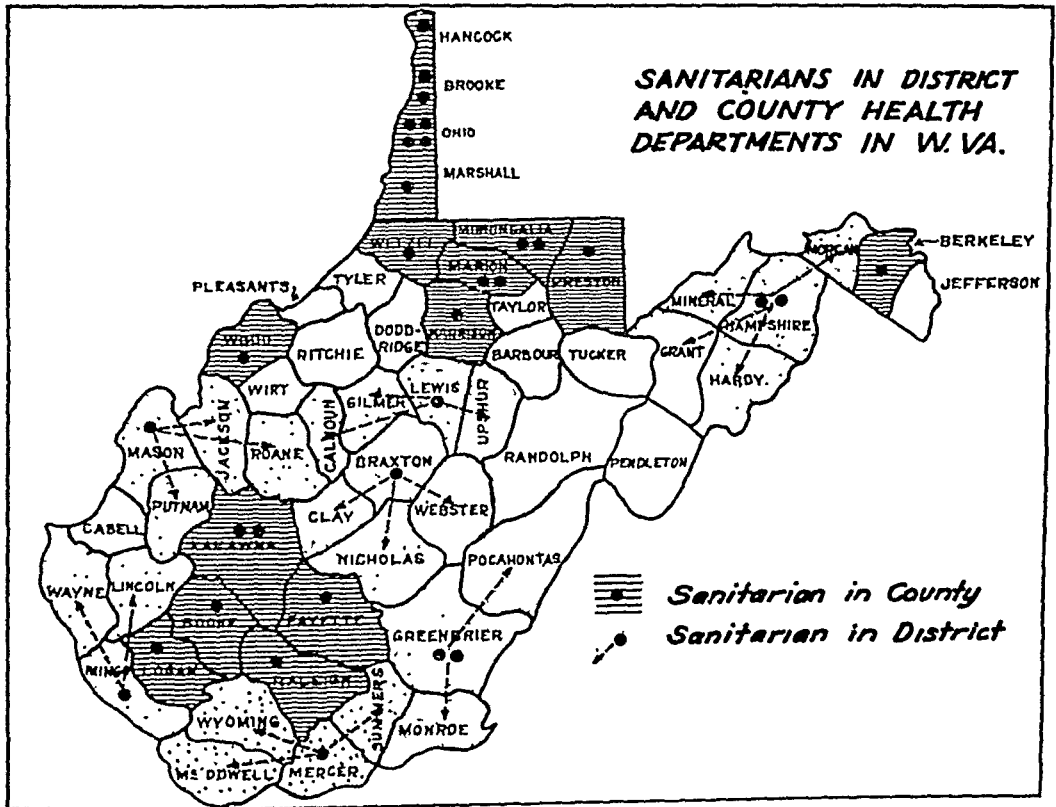


FIGURE 1

been used to insure better trained sanitarians and carefully planned programs in the 22 county and district health units which are serving 42 counties in West Virginia (see Figure 1).

MINIMUM QUALIFICATIONS ESTABLISHED  
BY REGULATION

The first step to insure qualified personnel in all full-time health units was the adoption by the Public Health Council of a regulation establishing minimum standards for health officers, nurses, sanitary engineers, and sanitarians. The minimum qualifications for sanitary engineers and sanitarians are as follows:

*Qualifications for Full-time Sanitary Engineers:* A sanitary engineer who is employed to do public health work in West Virginia shall not be over thirty-five years of age if entering this field for the first time. He shall be a graduate of a recognized school of engineering and shall be a registered professional engineer at the time of his employment or shall make application for registration to the

State Registration Board at its next succeeding meeting. He shall also have received special instruction in sanitation subjects during his college course or have at least three months postgraduate work in a recognized school of public health approved by the United States Public Health Service. He shall also have a minimum of six weeks' practical training at the West Virginia Public Health Training Center, or its equivalent in field work.

**Qualifications for Full-time Sanitarians:** A sanitationer who is employed to do public health work in West Virginia shall not be over thirty-five years of age if entering this field for the first time. He shall have successfully completed at least two years of college work, preferably in engineering or biological subjects. He shall also have at least three months theoretical training in a recognized school of public health approved by the United States Public Health Service and a minimum of six weeks' practical training at the West Virginia Public Health Training Center, or its equivalent in field work.

While the two classifications are distinct, hereafter in this paper the term *sanitarian* shall be used to include members of both groups.

## SCHOLARSHIP COMMITTEE

Health officers, sanitarians, and nurses for county and district health units are selected by a Scholarship Committee appointed by the State Health Commissioner and composed of the following persons:

Director, Bureau of County Health Work  
Director, Division of Maternal and Child Hygiene  
Director, State Hygienic Laboratory  
Supervisor of Sanitarians  
Supervisor of Nurses

It is the duty of the Supervisor of Sanitarians to receive and investigate applications for the sanitarians' positions. The investigation includes a personal interview, check-up of educational background, and inquiries to former employers and references. Only those applicants who are able to meet the minimum requirements are considered by the committee.

When an appointment is to be made, the committee considers the current applications and selects the names of those best qualified for the available position or positions. These men are then requested to appear before the committee for a personal interview. Following the interview and subsequent discussion, selections are made by the committee. Inasmuch as a majority of the men available thus far have needed special training, selection by the committee has included the granting of a scholarship for such training.

Selection by the committee instead of by an individual has two practical advantages: (1) group judgment is less apt to be in error, and (2) it discourages those who would seek to benefit from political affiliations.

## TYPE OF MEN SELECTED

In selecting county and district sanitarians, education and training are not the sole consideration. Personality, physical appearance, and temperament are important, and an effort is made to

select men who are not objectionably deficient in these qualities. It has also proved wise to emphasize the disagreeable tasks which may confront a sanitarian, in order to discourage those who are not sincere in their desire for this type of work.

Since the supervision of sanitarians began in 1936, 32 men have been selected for positions—28 of this number were college graduates, 10 were graduate engineers, 7 had B.S. degrees in agriculture, 7 had A.B. degrees, and the remaining 4 had one of the following degrees: B.S. in Medicine, B.S. in Public Health, or B.S. in Physical Education. Three of the men with agricultural training were originally selected as district milk inspectors and later transferred to county sanitarians' positions.

Of the 4 who did not have college degrees, 2 were undergraduate engineers.

## TRAINING OF SANITARIANS

The nation-wide expansion of public health work found a lack of trained personnel. Under Title VI of the Social Security Act, provision was made for training of personnel, and special short courses were arranged at universities located at strategic points throughout the United States.

West Virginia is in the area served by the University of North Carolina, and a majority of the sanitarians have attended or will attend a 3 months public health course at that institution.

## PUBLIC HEALTH TRAINING CENTER

To supplement the 3 months public health course and to familiarize the health officers, nurses, and sanitarians with practices and procedures in West Virginia, it was deemed advisable to establish a public health training center in conjunction with a county health unit. The training center functions in conjunction with the Monongalia County Health Department at

Morgantown, W. Va. Morgantown is the home of West Virginia University, and coöperation with this institution is of considerable benefit to the training center.

#### TRAINING SANITARIANS

The trainees are first assigned to an established health department to work with an experienced sanitarian for 1 month. They are then transferred to the training center for a 2 months period. Until recently a 6 weeks course was held, but this has been extended to 2 months.

While a field training center is not the place to conduct classroom work, a certain amount is essential to coördinate the practical work in the brief time allowed. Classroom work amounting to one-fourth of the total time is of the conference type, and didactic lectures are avoided. A similar period is employed for observation, closely coördinated with the lectures. The remaining half of the time is used in field practice under close supervision and on original

studies and surveys. A rigid pattern of training is not followed because of the differences in education, experience, and special abilities of the men, but the schedule (Table 1) shows the allotment of work in a course given to sanitarians who have just completed an academic course (3 months) at the University of North Carolina:

It is considered of primary importance that the health officer and nurses conduct certain of the conference and observation activities of the sanitarian trainee, so that a county or district health department can function as an integral unit rather than three separate departments, too often poorly coördinated.

Since the training center is in conjunction with an orthodox county health unit, the field training is practical and permits the inexperienced a brief period of seasoning before going on his own.

Experience has shown that trainees should come in groups not to exceed 2 per field sanitarian. The 2 months

TABLE 1

*Distribution of Work in a 6 Weeks Course of Field Training for Sanitarians*

Subject	Hours	
	Conference	Field †
Reports and Records	2	0
Water Supply	8	17
Sewage Disposal	5	19
Sanitary Privies	1	6
Milk and Dairy Inspection	14 *	35
Food Handling Establishment Sanitation	2	18
School Sanitation Inspection	2	7
Swimming Pools and Camps	2	4
Sanitary Survey of a Mine Town	10	49
Public Health Education	2	0
Communicable Diseases	2	0
Industrial Hygiene	2	0
Laboratory Services	2	0
Stream Pollution	2	0
Miscellaneous	2	12
Total	58	167

\* The large amount of conference work included in this item is brought about by detailed study of the U.S.P.H.S. Milk Ordinance and Code.

† Includes laboratory work and instruction.

field training course is inadequate, but in the pressure to provide personnel it has served its purpose. Experience has also shown that the training center can and will be valuable in holding special short courses for sanitarians in the field. A 1 week course in laboratory procedure was recently found to be of great value for those sanitarians who had previously completed the regular course of training.

The sanitarian in charge of the trainees at the training center coöperates closely with the Division of Sanitary Engineering of the State Department of Health, and adheres to its policies in his instruction.

#### PLACEMENT OF PERSONNEL

Following the completion of the field training course, the sanitarians are placed in a county or district health unit. Prior to placement, the supervisor of sanitarians and the sanitarian in charge of training confer in relation to the ability of each individual. An effort is made to fit the individual to the community.

#### SUPERVISION OF SANITARIANS

The supervision of sanitarians from January 15, 1936, until December 1, 1938, came directly under the Bureau of County Health Work, and the Supervising Engineer was responsible to the Director of that Bureau. This placed a technically trained man out of direct contact with the Division of Sanitary Engineering. While it was possible by frequent conferences to carry on the work in an effective manner, it was apparent that better results could be obtained by transferring all technical aspects of supervision to the Division of Sanitary Engineering, and the change was made on December 1, 1938.

The chief duties of the Supervising Sanitarian, in addition to his service on the scholarship committee, include the

placing of sanitation personnel and field supervision. The supervisor makes routine visits to all county and district health departments in the state, and during the past year this has averaged 7 visits to each unit. At the time of each visit aid is given in solving the most difficult problems; the sanitarian is accompanied and observed while on regular work; and office records are checked. Conferences between the supervisor, health officer, and local sanitarian are frequently held to discuss policy, iron out any differences of opinion, or to point out any weakness in the program.

A form for appraising the local sanitarians' activities has been devised and used with considerable success by the supervisor. The appraisal form is based on an assumed standard, and the activity of the sanitarian is compared with this standard. The appraisal is not used to compare one sanitarian with another, but to judge whether or not a balanced program is being followed, and as a check upon the sanitarian's progress. The appraisal has greatly improved record keeping and has discouraged the sanitarians from doing the work they like best to the neglect of other and often more important activities.

Another duty of the supervisor is the development of material for the use of county and district sanitarians. This includes new and revised record and inspection forms, the preparation and development of exhibits, motion pictures, newspaper articles and talks, bulletins, and similar items for education and instruction. Since December, 1936, the supervisor has edited a bi-monthly mimeographed publication to stimulate the exchange of ideas among the sanitarians.

It is not in the scope of this paper to describe a typical sanitation program of a county health unit in West Virginia, but it may be appropriate to

point out that the state public health laws and regulations tend to make reasonably uniform programs in all of the local health departments. These laws and regulations have been drafted for practical use and have been printed as a sanitary code in bulletin form. A loose-leaf manual of administration and procedure in county health work has been developed, and by reference to this the sanitarian can note the recommended procedure for most of the situations he will encounter.

The training and supervision of local sanitarians have been of immense help to the Division of Sanitary Engineering, since each local sanitarian considers himself a representative of the central office, and while his technical training and ability may limit the scope of his activities, he can help in quickly solving many local problems. As an example, individual private water and sewer systems for Federal Housing Administration homes built beyond public systems must be approved by the State Health Department. With local sanitarians available for inspections prompt service throughout the state has been possible. As another example, the local sanitarians have made it possible for the Division of Sanitary Engineering to institute an intensive drive to clean up tourist camps throughout the state. With supervision, the local sanitarians can be trusted to understand and follow instructions on problems such as these. These men also refer to the Division of Sanitary Engineering many local sanitation defects which would be overlooked otherwise.

#### DEFICIENCY OF PROGRAM

The chief shortcoming of the program in West Virginia results from an inadequate salary schedule. While the entrance salary is as high as the usual entrance salary in industry, the advancement that can be promised at this time is not sufficient to prevent the best

men from leaving for more remunerative positions. This is particularly true of technical graduates.

It is realized that each county or district sanitarian should have adequate technical training, and the brief training now provided is no substitute for this. The graduate engineer with a degree in public health, public health engineering, sanitary engineering option, etc., is best fitted for this position, although there is a definite place for men lacking such training. It has been noted that the engineer has a tendency to disdain the routine inspection work. The young graduate comes out of school enthusiastic about his technical knowledge only to have his ardor dampened by the very smallness of the problems he must solve. Experience in West Virginia has been that, with close technical supervision, the selected, non-technical graduate who has had some specialized training will hold his own with the engineer in the rural areas because he is more content to do the work, much of which is routine. To take advantage of the engineer's more advanced knowledge and to hold his interest, it is necessary that he be assigned to an urban or industrial area.

A sanitarian must know and be known in his community in order to do effective work. His value during the first year is limited, so it is essential that turnover of personnel be held to a minimum. Except for engineers, the turnover of local sanitarians in West Virginia has not been high. Since 1936, 32 men have been selected, trained, and placed in county or district health units. Of this number, 2 have been removed for the good of the service, 2 have been advanced to the Division of Sanitary Engineering, 1 resigned to return to college, and 4 (all engineers) have resigned to accept other positions. Errors in choice of sanitation personnel have thus far been limited to 2 persons.



## CONCLUSION

Since 1936, an effort has been made to coördinate and improve the quality of the sanitation programs in county and district health departments in West Virginia through careful selection, training, placement, and supervision of sanitarians. This effort has been successful to a marked degree.

# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

May, 1941

Number 5

---

H. S. MUSTARD, M.D., *Editor*

LEONA BAUMGARTNER, M.D., *Associate Editor*

MAZŮCK P. RAVENEL, M.D., *Editor Emeritus*

ARTHUR P. MILLER, C.E., *Associate Editor*

AUGUSTA JAY, *Editorial Associate*

## *Editorial Board*

REGINALD M. ATWATER, M.D.

*Chairman, and Managing Editor*

IRA V. HISCOCK, Sc.D.

KENNETH F. MAXCY, M.D.

HENRY E. MELENEY, M.D.

---

## THE CARIBBEAN AREA AND TROPICAL HEALTH

IT requires but little imagination to appreciate the delicate international problems that will inevitably arise in connection with Caribbean defense plans. In many instances in this area the United States of America will operate military and naval bases in "foreign" possessions and countries. To the residents of these sovereign powers, however, the military reservations of the United States will constitute the foreign soil and its troops will be the foreigners. Outside of each small base the culture, government, and daily life of each country will continue, and in such circumstances, the North Americans must adjust themselves to the local situation. In these matters we may safely rely upon the genius of the Department of State and upon the common sense and adaptability of the military and naval representatives of the United States.

A smaller, but nevertheless important, element involved in these international relations will be that of the public health, particularly as it relates to the military bases themselves and to the areas immediately surrounding them. Even in continental United States definite problems have been encountered in the areas adjacent to military reservations, because there are involved the health authorities of the military forces on the one hand, and of the local, state, and federal governments on the other. Extent and limitations of these respective authorities, the lack of funds, and the distribution of costs to meet unusual circumstances all enter into the problem. This being the case in the United States, one can easily foresee an accentuation of these problems where the base or cantonment in question is on foreign soil. Quite obviously the authority of the United States Government is sharply limited to the territory which is in its own possession. These areas will not necessarily be situated in localities where health conditions are all that may be desired, and even though the military authorities institute within their own boundaries the most excellent protection of water supplies, excreta disposal, insect control, and epidemiological precautions, the health situation in the camp or base must inevitably be affected by conditions which exist in the surrounding territory. In the Caribbean, this becomes a matter of particular concern because of the tropical environment and the

potential exposure of troops to diseases against which they have acquired no degree of immunity. Fortunately, through the work of the Rockefeller Foundation and the Pan American Sanitary Bureau, excellent relationships have been established with the public health authorities of the Caribbean and South American countries. Students from these areas have pursued graduate studies in public health in the United States, are informed as to continental public health methods, and are most cordially inclined to their colleagues in the United States. These influences should weigh heavily and should be capitalized in this Caribbean health problem, and they offer an opportunity whereby matters impossible of accomplishment through rigid official action may be brought to a happy conclusion by informal voluntary working agreements. It would seem entirely in order, too, to have such working agreements implemented and made practicable of attainment through some of the federal funds appropriated more or less directly in connection with interrelationships between North and South America.

Foresightedness demands not only that there be preparation for meeting in the near future the public health problems created by the Caribbean venture, but also that in continental United States more serious thought be given to health and disease in the tropics. The universities and the medical profession in the United States have not heretofore been active in this connection. A few of the former have attempted to provide courses, largely laboratory in character, but attendance has been slim and incidental to other major interests. Most of those who have received formal academic training in health and diseases of the tropics have had their work in England; many others have acquired expertness in one field or another through experience in the southern part of the United States or in tropical or sub-tropical areas of the world where they have been stationed. There can be no question but that a higher proportion of the medical profession of the United States should be better trained along these lines; and an even higher proportion of career people in public health should be thoroughly grounded in the health problems of the tropics. Practically all the European and Oriental schools of public health are closed or are unavailable, and for this reason as well as for others, training must be provided in the Western Hemisphere. An encouraging element in this connection is the School of Tropical Medicine in Puerto Rico. Here is an excellent institution with a strong faculty, adequately equipped laboratories, and a research hospital. The School has for some years offered a summer course particularly designed to provide instruction to third and fourth year medical students, and has made its facilities available to graduate students interested in special problems.

Problems of extra-cantonment work, particularly as they relate to health in the tropics, offer to every public health worker opportunities in both research and practice. There are fascinating implications in epidemiology; the statistician will encounter problems which will tax his ingenuity; the nutritionist will see stuff he has never before encountered; and the child hygienist will react either with extreme depression or a new burst of energy. There is ample interest and work in these areas for the sanitary engineer, and the administrator will have the opportunity to contribute something and to learn a great deal more. Health education will severely test its old concepts and possibly develop some new procedures. And in all these various lines of endeavor there are active, competent career people locally at work on these problems. With their help and with the opportunities offered, there should be awakened interest and performance in tropical health by those living in continental United States.

## COMPLACENCY AND PUBLIC HEALTH PRACTICE

FOR his own comfort the average individual must be reasonably well satisfied with himself: with his knowledge and skill, his height and his weight, his ability to take or leave wine and women, and with the length of his nose. Of course, there will always be a small minority who profess dissatisfaction with what they have done or are. But these are even fewer than they seem, for, if we except psychopaths in the grip of unpardonable sin, most of those who profess self-condemnation make a virtue of it and exhibit an amazing complacency in not being complacent.

For the young man, self-satisfaction is centered on those things which, at that time, are important to him. Regardless of the facts in the case, he is secretly proud of his physical prowess, courage, personal appearance, and casanovistic rôle. Even though he has not yet told the boss where to head in, he nevertheless has a mental picture of such a situation and experiences some part of the glow that would have been his had he actually discomfited the old man. All this is natural and commendable. It indicates ideals and a striving for them, and if the conceit is unfounded in this individual or that, it is so much a personal thing that no important public or professional matters are inhibited or disrupted.

As the years pass the inner demands for self-approbation, as a necessity for fronting the world, change in character. Usually the man of forty-five has made his peace with youthful aspirations and tends more to admire his own intellectual processes and the rightness of the thing he does or does not do in his day's work. Not only this, but because the maintenance of his place in the sun must to a great extent rest upon the group or organization to which he belongs, he is likely to exhibit a complacency in such membership. This is especially true if he occupies a position near the top. For self-protection then, as well as for self-satisfaction, those who have been party to the creation of a system of procedure or who participate in its administration must bind together in mutual admiration if they would accentuate their own glory and confound their competitors and critics. Health agencies are by no means immune to compounding such self-engendered complacency.

Of course, all health organizations need an esprit de corps, and should develop team work and a decent pride in things well done. Without these attributes, steady and sound progress and productive services are impossible. Complacency, however, is quite a different thing, and health agencies may pay a bitter price for accumulating this sort of smugness. It shuts the door to self-analysis and erects a barrier to the acceptance of new practices. It perpetuates dead wood and enlarges the sweep of empty gestures. It may be relied upon to leave undisturbed the sleeping dogs of program deficiencies, and it will never ruffle archaic procedure's shroud. Acting somewhat as an administrative endocrine, complacency will fatten the heads of commissioners and professors and editors, and deepen to belly-tones the pronouncements of bureau chiefs and executive secretaries.

With spring in the air it might be a good plan for us, in public health, to do some house cleaning, or at least to shift the organizational furniture around a bit. Maybe on inspection, some of the worn desk chairs will be found still to be quite sound, in need only of new occupants. Possibly it would be well to sun the mattress upon which we have been taking our administrative repose. Perhaps to get rid of an accumulated dust of ages, once and forever, we need a vacuum

cleaning process rather than the old duster. Certainly the rug of complacency, which has for so long deadened the sound of our false steps, needs an old-fashioned beating.

## THE WESTERN BRANCH OF THE ASSOCIATION

THE Western Branch of the American Public Health Association meets this month. From the program and the names of those participating, it will be a most worth while affair. Some of the papers presented will, in due course, find their way into the *Journal*, but the future publication of certain papers is not what we want to talk about. Instead, to those whose work is in central and eastern regions, we should like to emphasize an important fact. It is this: People living in the western part of this continent and in the outlying territories constitute an enterprising citizenry, amazingly independent of binding traditions, alert, and with a faith in the present and future. They are there not by chance, but because they or their fathers or grandfathers wanted to be there. And they are producing fine sons and daughters, with sunshine in their faces, and a spring to their steps. In egregious error, many on the eastern seaboard are inclined to consider playgrounds and playgirls as indices of western culture. Actually, the humid and overscented publicity that sometimes emanates from there no more represents the virile energy of that region than does a capon represent a gamecock.

It is not surprising that out of such a fine background there should have arisen a robust, vital Western Branch of the Association. To a most satisfying extent they have pulled together a large and competent group of workers representing official and voluntary health agencies, with strong members from productive foundations and universities. We shall avoid mentioning names in this connection, because of the danger of unintentional omissions. We shall, however, take this opportunity of expressing to the Western Branch our sympathy in the death of Dr. John L. Pomeroy, who served as their president in 1934. Here was a hard-driving man with a vision. He dared to plunge into untried fields in public health administration. Inevitably he made enemies, and it is possible that some of the things he did might better have been done in other ways, but he built an organization unique in its structure and philosophy, and set a pattern of procedure which may do much to solve in other parts of the country the problem of providing public health services in unusual circumstances.

And so, more power to the Western Branch. We are indebted to that region for many real public health contributions. We do not forget that California established in 1870 the second state board of health in the United States, nor are we unaware of the fine research in sylvatic plague, in tularemia, in Rocky Mountain spotted fever, in typhoid fever, in botulism, in coccidioidal granuloma, in poliomyelitis, in equine encephalomyelitis, psittacosis, and in various other matters, including health education and public health administration. May the coming meeting be even more successful than those of the past.

## LETTER TO THE EDITOR

## TO THE EDITOR:

The Board of Managers and the staff of the East Harlem Nursing and Health Service, New York City, announce with regret the termination of all activities in the immediate future—the student service will end with the spring semester in May, the services to the community as of June 30, 1941.

It may be recalled that the East Harlem experiment was started in 1923 by a group of local voluntary agencies for the primary purpose of studying nursing and health services in relation to family and community health needs, and that the community project became of more than local professional interest with the inauguration of the Student Service in 1928. It is to the many widely scattered friends of the Service—former staff members, students, visitors, and others—that this notice is addressed.

The decision to terminate the Service was made only after all efforts to secure sufficient new funds to offset diminished foundation support had failed. The Service has never been free to initiate any independent campaign for community support. It has been

known locally chiefly by the neighborhood people who are unable to translate their appreciation of, and need for, the Service in tangible terms; by professional workers, students, and visitors. After all possible economies had been effected, the point of the irreducible minimum was reached without insuring a balanced budget. A committee, appointed by the board, left no possible resource unexplored in its search for further funds, and saw no alternative except that the Service, in its present form, be discontinued. As much of the service as is possible will be incorporated into the programs of other health and welfare agencies. The influence of the experiment, we believe, will live on in the practice and philosophy of the many parents, workers, and students who have contributed to its development and have themselves been helped thereby.

The history of the early years of the East Harlem Nursing and Health Service has been told in a series of reports, articles, and monographs printed since 1925. A final report will be available after the Service is closed.

HOMER FOLKS,  
*Chairman of Board*

# Credit Lines

A Selective Digest of Diversified Health Interests

D. B. ARMSTRONG, M.D., AND JOHN LENTZ, M.S.

## A QUESTION AND AN ANSWER

An inquiry from "a constant reader" comes to the editors of this section asking if we ever encounter any health education material that is not to our liking. We are reminded that our comments all tend to be complimentary. Hence our correspondent asks point-blank: "Don't you ever come across any material that is poorly done? A few brickbats might prove as helpful as your bouquets."

To this question we can give a point-blank answer: Yes, we do encounter some health education material that is without much merit. But it is primarily the business of "Credit Lines" to be of service to health educators by publicizing accomplishments in the field. Furthermore, we naturally refrain from criticism because we realize that many health educators are faced with tremendous handicaps in producing their printed materials. As a general rule, health educators are hard pressed for time, their budgets are small, the facilities for turning out educational materials are inadequate. Hence, unless we should happen upon some widely used publication containing blatant errors (which is, after all, rare), we prefer to withhold criticism and continue to give our readers comments upon health materials that merit "bouquets," and that may be of value to many not

otherwise aware of the existence of such materials.

## A DISTINGUISHED REPORT

Although the Rockefeller Foundations *Review for 1940* chronicles unhappy events—the disappearance or decadence of great European institutions of learning and the attendant exilement of brilliant scholars—this annual statement by Raymond B. Fosdick, President of the Foundation, is nonetheless inspiring in that it reveals a determination on the part of this great organization to extend the frontiers of scientific knowledge despite world upheaval. No report is more eagerly awaited each year than this one, and no public health worker should fail to read the 1940 review. Copies will be sent to anyone applying for them, and requests should be directed to the Rockefeller Foundation, New York, N. Y.

Few reports are as brilliantly written as these annual statements and no one who reads Dr. Fosdick's text can refrain from underscoring or otherwise noting certain passages that are distinguished for their beauty and aptness of expression. Take, for instance, those passages of the current report in which Dr. Fosdick reflects upon the relationship of freedom to creative scholarship:

It is only in an atmosphere of freedom that the lamp of science and learning can be kept alight. In all the history of the race knowledge has never flowered in a subject people. It is only free men who dare to

think, and it is only through free thought that the soul of a people can be kept alive.

Or take the section of the report dealing with the development of the giant cyclotron, in which the author states:

The new cyclotron is more than an instrument of research. Like the 200 inch telescope it is a mighty symbol, a token of man's hunger for knowledge, an emblem of the undiscourageable search for truth which is the noblest expression of the human spirit.

The various public health and medical activities of the Rockefeller Foundation are surveyed in this 64 page report, but workers in our profession should turn to it not only for accounts of the Foundation's health program; it should be read, too, for the stimulation and encouragement that it conveys, as well as for the beauty, dignity, and clarity of its language.

#### MEET "DR. JONES"

Those who read *Health News* and those who listen to "The Health Hunters" (a publication and a radio program of the New York State Department of Health) need no introduction to "Dr. Jones." Thousands have made his acquaintance either through his column or through his radio appearances. Dr. Jones deserves a much wider audience than that reached in New York, and *Credit Lines* is honored to introduce him to those who have not met him heretofore. "Mortimer Jones, M.D." is the way he signs his name.\* He is an elderly physician—"a progressive doctor of the old school"—who serves as the health officer of a small mythical community called "Utopia." The column which he writes for *Health News*—entitled "Dr. Jones Says . . ."—has become one of the most popular features of that periodical—so popular in fact that Dr. Jones's essays have now been assembled in

book form in response to a demand from his readers.

It is easy to understand why admirers of Dr. Jones desired to have these essays collected and printed in permanent form, for his writing is unique in the field of health education. Dr. Jones's versatility is astounding. He can turn out an essay on practically any subject—be it psychoanalysis or the breeding habits of flies. To "put over" his health messages, he combines homespun philosophy, amusing anecdotes, and sound advice. Perhaps the flavor of Dr. Jones's essays can be in part conveyed by quoting excerpts from them:

"If somebody shoved me into the ring (which they ain't liable to) and up against Joe Louis, I wouldn't wait for him to sock me. I'd lay down and take the count—and stay there 'til the referee said the fight was over. And I'd do the same with influenza."

"I don't know but it would be a good thing if we'd forget all about death rates and the span of life and all that sort of thing for awhile and devote our attention to seeing that the folks that are living—that are right here now—today—get some satisfaction out of it. Feed the ones that are hungry; the ones that are worried, help 'em with their problems and give 'em a little human sympathy, where they need it, and so on. State of mind, according to my way of thinking, is more important than length of years. If you haven't got happiness you haven't got health."

"Yes, sir; you'd be surprised all the things folks expect the health officer to do: make their landlord turn on more heat; stop somebody's dog from barking; shut off a smell they don't like; take a dead cat out of the road that somebody's run over; in fact, they expect him to be everything from the garbage man and village cop to Santa Claus."

"Plenty of times folks need the doctor's personality more'n they do his pills."

"When you find a problem child—look for a problem parent."

"Specialists and group medicine and so on—they're fine in their place—that is, when they're good—but they'll never take the place of the 'family doctor.' And any system of practice that don't allow for the personal relationship between doctor and patient it won't stand up—not if I'm any judge."

\* "Mortimer Jones, M.D." in reality is Dr. Paul B. Brooks of the New York State Health Department.



Copies of "Dr. Jones Says . . ." are available from the State Health Department, Albany, N. Y., without cost. A limited number of these books have been printed and once the news gets around that they may be had for the asking, we predict they will go like hot cakes. Better hurry and ask for your copy!

#### PICTOGRAPHS—"HANDLE WITH CARE"

Expressing or interpreting statistical data by means of symbolic drawings or pictographs has become a widely used technic among health educators. Indeed this technic has become so popular that pictographs are no longer limited to the interpretation of statistics—they are now used to dramatize facts, ideas, and situations in all types of health education material. That this new technic is frequently misused is the contention of two pictograph experts—Rudolf Modley and Herbert C. Rosenthal. In an article entitled "If You Say It in Pictographs," which appeared in the February-March, 1941, issue of *Channels*, Messrs. Modley and Rosenthal set forth a number of "don'ts" that one should know before attempting to use this medium. The authors specifically state that the amateur artist should proceed with great caution when attempting to use this technic—or else this symbolic picture language may fail completely to convey the thought one seeks to express. The ideal pictograph, according to the authors, is one which "tells its own story and drives home its own message, without benefit of copy." In other words, the pictograph must be so skillfully conceived that it will tell a story in visual terms alone, without the use of word, captions, or text. Remember this the next time you are tempted to illustrate some material by means of "these clever little drawings." If you have access to the issue of *Channels* in which the above mentioned article ap-

pears, we advise reading it in full, since the use of pictographs in health publicity is becoming increasingly popular.

#### USEFUL CATALOGUES

No health agency should be without the following useful catalogues:

1. The government catalogue listing publications relating to health, diseases, drugs, and sanitation. (This is a 97 page booklet which gives the titles and prices of all publications issued by various government agencies on the subjects enumerated. It is available from the Superintendent of Documents, Washington, D. C.)

2. The catalogue of health publications of the American Medical Association. (This publication lists and describes the many and varied health materials published by the A.M.A. In addition to pamphlets on the more popular health topics, this agency also offers health plays, posters, and analyses of present-day medical problems such as socialized medicine, group hospitalization, sickness insurance, etc. The catalogue is available from the American Medical Association, 535 N. Dearborn Street, Chicago, Ill.)

3. The catalogue of the American Dental Association. (This publication lists and describes the dental health educational material prepared and distributed by the A.D.A. Booklets, motion pictures, lantern slides, posters, models, charts, and items designed especially for children are among the materials offered. Copies of this catalogue may be secured by writing the American Dental Association, 212 East Superior Street, Chicago, Ill.)

As one thumbs through these catalogues, he cannot help but be impressed with the wealth of information that may be had from these sources. As long as these agencies continue to function, the health educator need never be without the materials necessary to his work.

#### CONCERNING SOME HEALTH PUBLICATIONS

*The Place of Child Health in a Tuberculosis Program* — Prepared by Louise Strachan and published by the National Tuberculosis Association.

This is a splendid handbook which

will be valuable not only to tuberculosis associations, but also to other groups concerned with the conservation and improvement of the health of young people. It is a thorough study of the influences affecting child health. Interested persons will find this handbook helpful from a practical point of view in that it shows how the available resources of the home, the school, and various community organizations may serve to advance child health. It emphasizes the importance of coöperative community planning. Pointers for guidance in parent education, school problems, teacher education, legislation, community group activities, and other fields are listed, with specific examples of coöperation actually existing today in certain communities. Other commendable features of this handbook are the carefully selected list of references and the chart portraying child health as a heart nourished through the home, the school, and the community.

*Organization and Administration of School Health Work*—By Fred Moore, M.D., and John W. Studebaker. Published by Federal Security Agency, U. S. Office of Education, Washington, D. C. Available from the Superintendent of Documents at 15 cents a copy.

This monograph represents a constructive effort on the part of the authors to acquaint school administrators with the desired objectives of a well rounded school health program. It points out that, in order to administer a school health program successfully, two requisites are necessary: (1) the school administrator, supported by his board of education, shall be committed to an educational program in the field of health, and (2) the responsibility for this program must be delegated to someone with adequate health knowledge, and with ability to coördinate the teaching personnel and to enlist parent support. The authors

have organized their material so that readers may easily follow the various policies and procedures recommended. Anyone concerned with school health work will find this publication helpful and provocative.

*Healthful Living through the School Day and in Home and Community*—revised edition—By Nina B. Lamkin. Issued by the State Department of Public Health, Santa Fe, N. M. Price, 25 cents.

The philosophy of health education outlined in the revision of this guide for teachers is that of healthy living throughout the day. It is commendable in that it has been compiled by using the experiences of teachers as basic material and shows particular concern for coöperation between the home, the school, and the community. With new emphasis on 24 hour activities, on pupil participation, and individual development, it illustrates the principle that constant revision of materials is necessary if school health education is to keep abreast of changing educational practices and scientific advancements. However, our knowledge of the way people behave has advanced even beyond what is herein described.

*Give the Doctor a Break*—By Floyd Burrows, M.D. Published by the Medical Society of the State of New York, 292 Madison Avenue, New York, N. Y. Single copies 10 cents.

In this booklet, "the little man with the black bag" (the general practitioner) is defended against all advocates of group medical practice. The author states his case in strong language in order that "a befogged and befuddled public may be given a correct point of view regarding the medical profession." Dr. Burrows admits that a certain amount of "medical house cleaning" is needed but he maintains that this is a job that should be left to the doctors rather than to the politicians, social workers, and government

clerks. "Eighty-five per cent of the profession is opposed to group practice, socialized medicine, state medicine, compulsory health insurance, or medicine called by any other name," states Dr. Burrows. We have never read a more vigorous defense in behalf of "the little man with the black bag."

R.S.V.P.

The Social Work Publicity Council (130 East 22nd Street, New York, N.Y.) is bringing up to date their portfolio collection of publicity examples for display at the National Conference of Social Work at Atlantic City, N. J., June 1-7, and the American Public Health Association convention in October.

If you would like your material to be considered, won't you send them two copies of that new letterhead or folder, that annual report, newspaper feature, or radio script which was "the best yet"?

#### NOTES ON ANNUAL REPORTS

Annual reports of health and welfare agencies continue to reach our desk in an unending stream. Space does not permit comments on each, and consequently we have selected a few reports which, for one reason or another, have that "extra something" that sets them apart and makes them worthy of special reference. Many reports for 1940 were similar in that they were developed around a patriotic or national defense theme. In fact, there were only a few agencies that seemed able to resist the temptation to mount the patriotism bandwagon, a heavily laden vehicle these days.

The national defense theme was especially well carried out in the annual report of the Memphis, Tenn., Department of Health. The authors of this report used the health-defense theme in such an original manner that the "far waving" element was reduced to

a minimum. Entitled "The Ramparts We Watch," this report is nicely arranged, printed, and illustrated. Moreover, it has true educational value for the community which the department serves. Congratulations to the author on the entire report and especially for the page given over to "An American's Health Creed."

The annual report of the executive office of the National Tuberculosis Association is a straightforward account of the association's activities and achievements for the year 1940. The physical appearance of the report is inviting in that the cover combines effective lettering, layout, and use of color. The photographs accompanying the text are excellent. Readers of this report will rejoice in the news that the expected income from the 1940 Christmas Seal Campaign will approach the 6 million mark, the highest in the association's history.

The twenty-sixth annual report of the National Society for the Prevention of Blindness is entitled "Eyes Right!" The cover of this report is an "eye catcher" which shows a group of toy soldiers responding to the command: "Eyes Right!" The outstanding activities of the year are reported in a special section called "Headlines of 1940"—each of which describes the society's sight conservation activities in various fields.

"Working Hands" is the title and theme of the 1940 Annual Report of the Hartford, Conn., Tuberculosis and Health Society. The report shows by means of photographs and text how idle hands become working hands through rehabilitation. This is an exceptional report, reflecting the enthusiasm of the organization's staff for the work that is being done.

Finally, there is the annual report of the Motion Picture Producers and Distributors of America (the Will Hays' office) on our desk. Surprisingly

enough, it touches upon the relationship of the motion picture to public health.

Says Mr. Hays: "In the emergency that faces us today the universal entertainment of the screen is a definite element in national defense. If the movies supplied nothing but relaxation, ours would still be an essential industry. —vitally essential in maintaining public health under the present nervous strains, vitally essential for the rest and recreation that must keep our human machinery up to the needs of speedy and increasing production, and essential also for our mental health."

FRAMINGHAM, MASS., ESTABLISHES  
A NEW "LOW"

Many readers will remember the Framingham Tuberculosis Demonstration, and that Framingham, Mass., was the site of the first organized effort at community control of a disease by special experiment, an experiment that was the forerunner of many subsequent demonstrations under the auspices of the Commonwealth Fund, the Milbank Memorial Fund, the Red Cross, and other agencies.

The Health Department of Framingham reports a new low record for all time in its tuberculosis mortality in 1940—12.5 per 100,000. This is to be compared with the following previous Framingham records:

1907-1916 (decade average)	121.0
1916	95.5
1923 (when the Demonstration closed)	38.2
1939 (minimum up to that time)	17.6

The Framingham Demonstration was one of the many evidences of far-sighted vision on the part of the late Dr. Lee K. Frankel, and was carried out under the direction of the National Tuberculosis Association, with financial support from the Metropolitan Life Insurance Company.

Another record worth noting is that having to do with diphtheria control, as reported by the New York State Health Department and the State Charities Aid Association. It is stated that for the more than 13,000,000 people in both New York City and New York State, there were no deaths from diphtheria in January, 1941—the first time this combination of circumstances for the city and the state has prevailed!

## BOOKS AND REPORTS

**The Parasites of Man in Temperate Climates** — By *Thomas W. M. Cameron*. Toronto: *University of Toronto Press*, 1940. 182 pp. Price, \$3.00.

This brief, authoritative presentation of the animal parasites of man is surprisingly satisfying for an introductory guide to the protozoa, helminths, and arthropods parasitizing the human body, in the north temperate zone. Following a very brief introduction each of the three important groups is presented, first in general outline form, then with special reference to the common human forms. Thus, among the protozoa, the amebae, intestinal flagellates, ciliates, trypanosomes, and malaria parasites are presented in sequence; among the helminths, the pinworm, *Ascaris*, whipworm, trichina worm, hookworms, Bancroft's filaria, intestinal flukes, liver flukes and blood flukes, the more important tapeworms, and leeches; among the arthropods, the mites and ticks, mosquitoes and other blood-sucking flies, filth and myiasis-producing flies, lice, fleas, bedbugs and assassin bugs, scorpions, centipedes, spiders, wasps, bees, and ants. In connection with or following each major pathogenic species or group there is a succinct consideration of diagnostic technics and control by medication or preventive measures.

Judged by the space devoted to each, the following parasite diseases are of major importance in the north temperate zone: malaria, oxyuriasis, trichinosis, bedworm infection, fish tapeworm infection, and hydatid disease. For the United States amebiasis should be given more consideration and the tapeworm infection, a relatively minor rôle.

The technical terminology is, with

very few exceptions, that commonly accepted by the leading medical parasitologists. The information presented is unusually accurate and modern, the style is clear and typographical errors are minimum. The illustrations are original and effective. (It is noted, however, that the life-cycle diagram of *Plasmodium vivax*, p. 21, fails to include the exoerythrocytic phase of the cycle in man.) There is a two page bibliography and a short subject index. The volume is pleasingly printed and modestly bound.

ERNEST CARROLL FAUST

**Laboratory Manual for Physicians: Aids in Diagnosis and Treatment (7th ed.)**. Albany, N. Y.: *Division of Laboratories and Research, State Department of Health*, 1940 103 pp.

This *Manual* is a description of the laboratories of the State Department of Health and the services rendered by them to the physicians of the state. It tells what specimens can be examined to aid in diagnosis and treatment as well as the proper methods of collecting such samples and shipping them to the laboratory. It is divided into seven parts, describing first the organization and operation of the laboratory service, the list of communicable diseases for which examinations are made, and facts concerning the examination of water, sewage, and milk, which includes the study of samples from swimming pools and bathing areas.

The material is all up-to-date and it is practical. In other words, it is a manual describing to the physicians of the state the services offered to them

and explaining how they can be made use of most effectively. There are some 120 local approved laboratories throughout the state for certain types of work which can best be done on the spot, and, during 1939, more than five million examinations were made at these, while the central laboratory and its one branch in New York City made 740,000 examinations, which attests the great work being done for the citizens of the state through the medical and allied professions. MAZŸCK P. RAVENEL

**Guide to Library Facilities for National Defense**—*Edited by Carl L. Cannon for the Joint Committee on Library Research Facilities for National Emergency (Preliminary Edition).* Chicago: American Library Association, 1940. 235 pp. Price, \$1.25.

This compilation is an attempt to list in concise form the resources in United States libraries useful for reference and research service to national defense. The edition is preliminary and tentative. A revised edition is in preparation. It is quite evident that there is need for it, as there are many glaring omissions in subjects and libraries, notably in the health field. The material is arranged under large headings, most of which relate to war industries. Some, however, would be of interest to readers of this *Journal*. Among them are Food Supply, Health, Sanitary Engineering, etc. Under the headings the libraries are arranged by regions of the country and each library has a note describing the collection on that particular subject. An index by more detailed subject, and an alphabetical list of libraries with addresses add to the value of the book. I. L. TOWNER

**Perchloron.** Philadelphia: Pennsylvania Salt Manufacturing Co. (1000 Widener Building), 1941. 32 pp.

Perchloron is a calcium hypochlorite, is used in water purification, for sewage

treatment, for swimming pool sanitation, and as a bactericide in the food industry.

This bulletin tells what Perchloron is, its advantages, preparation of Perchloron solutions, feeding Perchloron, and the determination of residual chlorine. A useful booklet for the non-technical person.

ARTHUR P. MILLER

**Health Activities and Problems: An Experience Workbook for the Secondary School Student**—*By D. Oberteuffer and P. C. Bechtel.* Boston: Houghton Mifflin, 1940. 147 pp. Price, \$.60.

This Workbook for the secondary school provides an activity and study outline to be used with several different textbooks and reference books to which references are given in connection with each unit. The Workbook is organized into eighteen units, many of which are divided into several parts or minor topics. Each topic gives an introductory paragraph for orientation, a list of textbook references, and a section on problems and activities. In the last mentioned section, there are opportunities for the student to write definitions and discussions in the Workbook, and there are many suggestions for other activities for the student and for the group. Many of the activities are in the nature of interesting and practical library investigations. Other activities are for field or laboratory investigation. It is inevitable that such activities as "Make cultures of bacteria secured from common objects," and "Demonstrate how bacteria may enter through a break in the skin," will not be practicable for all high school situations. Additional blank space and consistency in the ruling of the existing blank spaces would be helpful.

The Workbook is a careful, constructive, and helpful piece of health education material. C. E. TURNER

**Bacteriology in Neuropsychiatry**—By *Nicholas Kopeloff*. Springfield, Ill.: Thomas, 1941. 316 pp. Price, \$4.50.

The author has attempted to present the rôle played by bacteria and other infectious agents in diseases characterized chiefly by pathology of the nervous system and in diseases in which such manifestations are only of secondary importance. Material of this kind is buried in clinical, immunological and bacteriological literature, and those interested should be grateful to Dr. Kopeloff for compiling this book. However, one wonders if the mere presentation of clinical signs and symptoms which constitute much of Parts I and II will be of any great assistance to either bacteriologist or clinician.

Dr. Kopeloff has recognized the controversial nature of much of the material he presents and has, in certain instances, added critical analyses of the experimental work he reports, analyses which add much to the book. This is particularly true of the section on "Immunology of the Central Nervous System," a field in which the author's own researches have led him. And this section, in the opinion of this reviewer, is the most valuable one in the book, for here is a record of experiments in widely scattered laboratories abroad and at home with a critical evaluation of the data upon which conclusions have been based.

LEONA BAUMGARTNER

**Back to Self-Reliance**—By *Matthew N. Chappell*. New York: McGraw-Hill, 1940. 239 pp. Price, \$2.00.

The author is the present director of the Free Personality Clinic, conducted by Christ Church, Central Presbyterian Church, and Central Synagogue of New York City. He is a member of the Department of Psychology of Columbia University.

An earlier publication is *In The Name of Common Sense*.

Dr. Chappell in his author's note informs us—

... this is neither a psychological plea for nor defense of any modern political theory. Nor strictly speaking is it a scientific book. Rather it is based on the clinical experience in the field of human relations, and on the firm convictions that man is not a helpless victim of his environment.

He starts out with the premise that emotional under-development has no inherited basis. Our emotional immaturity is founded on the over-protection we have received in our homes, schools, and more recently under our "paternalistic government." He discusses the WPA project as a natural outgrowth of this trend.

His solution to overcome our dependence is in practising self-reliance. He feels that few people have any idea of their ability to modify their emotions, attitudes, and habits more in line with their own happiness and achievement.

The reviewer questions the advisability of giving a definite set of rules as in chapter VI and VII, which, if followed, will produce happiness for all readers, irrespective of their emotional stability. The danger to readers with limited insight into personality maladjustments is at once apparent.

Many readers will doubtless disagree with the author's contention that movie attendance and the radio are substitutes for individual endeavor. It has been the experience of the reviewer that they contain positive factors as well. These are often the focal points for dissemination of knowledge, and, as such, have educational values to the individual.

He states the function of all great religion is "to foster belief in those principles which lead a man to the fullest use of his own life and powers." He feels that Americans have not made full use of this factor in the development of personality in recent years.

The goal of this book seems to be

to stimulate thought on many subjects of timely interest, and point the way to self-help. The benefits derived from the book will depend entirely upon the background of the reader and his interpretation of the material found.

LELA M. ELLEDGE

**Social Work Year Book, 1941: Sixth Issue** — *Edited by Russell H. Kurtz. New York: Russell Sage Foundation, 1941. 793 pp. Price, \$3.25.*

This description of organized activities in social work and in related fields, prepared with the assistance of an advisory committee of well known leaders and carefully edited, is a valuable source book. The first major section consists of a group of 83 signed articles. It is full of "meat," and written by authorities on the topics discussed. At least 15 of these articles deal with subjects of special interest to public health workers. The section on Public Health is another grade A product of the executive office of the American Public Health Association. Part two is a directory of national and state, governmental and voluntary agencies. Cross references facilitate the use of the volume and also serve to emphasize, as does the entire book, one of the factors in community life—the inter-relationships of the various parts of our social structure and of health and social services rendered at the national, state, and local levels. "Prepared under the shadow of a new emergency," the articles naturally "reflect the sudden concern being felt over the state of our national defenses." IRA V. HISCOCK

**Notter and Firth's Hygiene**—*Revised by L. C. Adam and E. J. Boome (10th ed. rev.). New York: Longmans, Green, 1940. 518 pp. Price, \$3.50.*

The first edition of *Notter and Firth's Hygiene* was published in 1894.

During the following years editions appeared at intervals up to 1921. From then until the publication of this 10th edition in 1940 no further revisions had been attempted. In view of the great advances in this field during this long period, extensive deletions and additions were necessary in an attempt to bring this work abreast with present knowledge. These revisions have been carried out by L. C. Adam and E. J. Boome of the Public Health Department, London County Council.

In the opinion of the reviewer, this book is of value from the historical standpoint and also as reflecting the current applications of hygiene in the British Commonwealth. It accordingly should appeal to students of sanitation and to all those concerned with the improvement of social conditions. It is not recommended, however, as a textbook, except for reference purposes, for the instruction of medical students in public health and preventive medicine and may not, in fact, have been intended to serve such a purpose.

JOHN C. TORREY

**Tuberculosis and Genius** — *By Lewis J. Moorman, M.D. Chicago: University of Chicago Press, 1940. 272 pp. Price, \$3.00.*

Many men of genius have suffered from tuberculosis—Dr. Moorman gives an impressive list of them, p. xxxii—and the problem whether there is a relationship between a poet's or an artist's tuberculosis and his creations has puzzled many writers. Every serious illness has a profound effect on a man's life. It interrupts his daily routine, and the proximity of death is a stirring experience. This is particularly true in the case of a serious chronic disease like tuberculosis with which a man lives for many years facing death and yet hoping to escape it. The poet and the artist are particularly sensitive individuals, and it is obvious that their



creations must reflect in some way or other the fears and hopes, the emotions and experiences to which the disease subjects them. It is doubtful, however, whether tuberculosis exerts any specific influence on the man of genius. Alcohol and other drugs do, and it has been claimed that the tuberculosis toxin was responsible for the unwarranted optimism—the *spes phthisicorum*—the increased *libido* and the stimulations felt by many patients. This is possible, but Dr. Moorman's book does not make it evident.

After an introduction that states the problem the author pictures the life and work of ten men and women of genius, Stevenson, Schiller, Marie Bashkirtseff, Katherine Mansfield, Voltaire, Molière, Francis Thompson, Shelley, Keats, and Saint Francis of Assisi. The biographies are well written, and they are all extremely moving, particularly the diary of Marie Bashkirtseff. They all tell of heroic struggles, of great creations in spite of the disease. It is impossible, however, to find any pattern in the work of the people discussed. The works of Schiller and Voltaire, of Stevenson and Katherine Mansfield are as different as could be. The disease does not explain the work. And yet there are cases where the relationship is much more apparent. The choice of subjects of a painter like Watteau, the light-hearted scenes that he pictured in his paintings seem to be an attempt to create for himself a world from which he was excluded inexorably by his illness. The disease may also partly explain the enormous productivity of Mozart who, feeling that he was doomed, hurried to express all the emotions that filled his heart.

Dr. Moorman's book will certainly fulfil the purpose stated in his preface. It will give courage and inspiration to the afflicted and will promote tolerance and sympathy for those who suffer.

HENRY E. STELNER

**Orientation in American Dentistry. Its History and Social-Professional Background. A Text—Workbook for Dental Students and Professional Health Workers**—By Alfred J. Asgis, Sc.B., M.A., D.D.S., Ph.D. New York: Clinical Press, 1940. 126 pp. Price, \$2.50.

Asgis is continuing his pedagogic approach to dental education in the present volume which deals with the history and social-professional background of American dentistry. As a rule the dental student is in his senior year—and frequently not even then—before he begins to realize that he knows nothing of the social and professional aims, implication, background and promise which his profession holds forth.

The present volume may well be used as a work-book for first year dental students, to familiarize them with dental problems in and outside of the dental school. The student may learn in this book the nature and scope of dentistry as a profession and as a health service, its professional and social problems, its relationship to other health professions and notably to public health and community life. It points out the opportunities in dentistry as a career and as a professional pursuit. The method used by Asgis, while hewing close to a prescribed course of study, nevertheless allows much self-activity on the part of the student and provides practically all of the significant references to the field covered.

J. A. SALZMANN

**Diseases Transmitted from Animals to Man**—By Thomas G. Hull (2d ed.). Springfield, Ill.: Thomas, 1941. 403 pp. Price, \$5.50.

The first edition of this book, which appeared in 1930, made a favorable impression and showed the need for a work of this type. The second edition carries further the plans of the first, and brings the material up to date. Six new chapters have been added. Owing to a change in the field of his activities, the

author has called to his assistance 14 persons skilled in their respective fields who have either written or reviewed the various chapters of the book.

The recognition that animals and man are more closely related, as far as their diseases go, than was formerly thought makes this book especially useful. It is well put together. The facts given are well authenticated and the treatment of each subject is sufficiently full. We like particularly the short histories with which the chapters begin.

The one criticism we would make is that the bibliography is not up-to-date in a number of instances, and sometimes an inconclusive paper of the nature of a progress report is given

when the final paper should have been quoted. A striking example of this is found in Tables 2 and 3, pages 15 and 16, the first dated 1917 and the second 1922, whereas Griffith in 1938 published a table in the *Proceedings of the Royal Society of Medicine* covering much of the same ground, brought up to date. The result is that the book does not give a fair idea of the amount of pulmonary tuberculosis due to the bovine type of tubercle bacillus found in England and other countries.

The book is well illustrated and is an example of the printer's art for which the publishers are so well known. The book can be highly recommended.

MAZÛCK P. RAVENEL

## BOOKS RECEIVED

VITAL STATISTICS OF THE UNITED STATES, 1938. Part 1. Natality and Mortality Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, and the Virgin Islands. Washington: U. S. Government Printing Office, 1940. Price, \$1.75.

Part II. Natality and Mortality Data for the United States Tabulated by Place of Residence. U. S. Government Printing Office, 1940. Price, \$1.25.

SEVEN DECADES OF MILK. A HISTORY OF NEW YORK'S DAIRY INDUSTRY. By John J. Dillon. New York: Orange Judd, 1941. 340 pp. Price, \$3.00.

APPROVED LABORATORY TECHNIC. By John A. Kolmer and Fred Boerner. 3d ed. New York: D. Appleton-Century, 1941. 921 pp. Price, \$8.00.

HUTCHISON'S FOOD AND THE PRINCIPLES OF DIETETICS. Revised by V. H. Mottram and George Graham. 9th ed. Baltimore: Williams & Wilkins, 1940. 648 pp. Price, \$6.75.

FIRST AID IN EMERGENCIES. By Eldridge L. Eliason. 10th ed. Philadelphia: Lippincott, 1941. 260 pp. Price, \$1.75.

PUBLICATIONS OF THE UNIVERSITY OF PENN-

SYLVANIA BICENTENNIAL CONFERENCE. Medical Sciences.

Problems and Trends in Psychiatry. By Thomas M. Rivers, *et al.* Price, \$.75.

Therapeutic Advances in Psychiatry. By Edward S. Strecker, *et al.* Price, \$.50.

Medical Problems of Old Age. By Louis I. Dublin, *et al.* Price, \$.50.

Nutrition. Conrad A. Elvehjem, *et al.* Price, \$.50.

Female Sex Hormones. By Edward A. Doisy, *et al.* Price, \$.50.

The Relation of Diseases in Lower Animals to Human Welfare. By John R. Mohler, *et al.* Price, \$.50.

Modern Aspects of the Antituberculosis Program. By J. Burns Amberson. Price, \$.50.

Chemotherapy. By E. K. Marshall, Jr., *et al.* Price, \$.50.

A Challenger to Scholarship. By W. Mansfield Clark. Price, \$.50.

BROADWAY STOMACH. By Joseph F. Montague. New York: Simon & Schuster, 1941. 356 pp. Price, \$2.00.

BIOLOGICAL SYMPOSIA. Vol. II. Edited by Jaques Cattell. Lancaster: Jaques Cattell Press, 1941. 270 pp. Price, \$2.50.

MORREY, L. W. School Programs for Dental Health. *Pub. Health Nurs.* 33, 3:157 (Mar.), 1941.

"Patient, Hardworking, Imaginative, Generous"—All of us will be thrilled by this brief but intensely absorbing account of the more recent researches of the late Hans Zinsser upon typhus fever and other rickettsiae.

OLITSKY, P. K. Hans Zinsser and His Studies on Typhus Fever. *J.A.M.A.* 116, 10:907 (Mar. 8), 1941.

**Health in Industry**—Fourteen excellent papers on industrial hygiene that were read at the third annual conference on industrial health will be of interest to many sanitarians. Of particular moment to most of us will be those on acute respiratory diseases, visual efficiency, air conditioning, and aging as an industrial problem.

PIERSOL, G. M., *et al.* Acute Respiratory Diseases (and 13 other papers). *J.A.M.A.* 116, 13:1339 (Mar. 29), 1941.

**Sic Transit Gloria Tuberculin Testing**—In brief, these are the conclusions of the completely reported Chicago experience: routine skin testing in elementary school age groups is unproductive; considering the expenditure its educational values are problematical; the value of the tuberculin test as a morbidity index is open to question; and its value as a case finding screen has been overemphasized.

Miniature x-ray photography of susceptible adult and adolescent groups is a more effective public health instrument. Under the same title a summary of the work is reported as noted below. It cost \$450 to find each case by the examination of school children. In 2 months' use of the portable unit in high incidence neighborhoods, 331 new cases were found.

TICE, F. Tuberculin Testing in the Chicago Schools. *Bull. Chicago Munic. Tuberc. San.* 18, 1:7 (Mar.), 1941; (also) *Am. Rev. Tuberc.* 18, 1:96 (Jan.), 1941.

**About Motion Pictures**—Selling public interest in and support for the municipal water supply via the color motion picture is ably discussed in a paper which might well be read by health workers concerned with other branches of the public health service.

WEIR, W. V. How To Make a Motion Picture of the Water Works. *J. Am. Water Works A.* 33, 2:201 (Feb.), 1941.

**Guide to Children's Progress**—Physical fitness from infancy to maturity may be plotted upon an ingenious grid which will supply objective ratings on body build, developmental level, nutritional status, maturation, basal heat production, and daily caloric intake, simply by recording the height and weight of each age level.

WETZEL, N. C. Physical Fitness in Terms of Physique, Developmental and Basal Metabolism. *J.A.M.A.* 116, 12:1187 (Mar. 22), 1941.

## ASSOCIATION NEWS

SEVENTIETH ANNUAL MEETING  
ATLANTIC CITY, N. J., OCTOBER 14-17, 1941

HEADQUARTERS  
Convention Hall

### APPLICANTS FOR MEMBERSHIP

*The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.*

#### *Health Officers Section*

Charles H. Balsley, P. O. Box 844, Connells-  
ville, Pa., Health Officer  
John O. Barfield, M.D., Panama City, Fla.,  
Director, Bay County Health Unit  
Carle W. Beane, M.D., Court House, Eaton,  
Ohio, Health Commissioner, Preble County  
Board of Health  
John W. Billingsley, M.D., 120 First St. North,  
Newton, Iowa, City Physician  
Wyatt T. Burkett, M.D., Public Health  
Service Bldg., Dothan, Ala., Health Officer,  
Houston County Dept. of Public Health  
Ernest A. Cook, M.D., County Health Dept.,  
Wedowee, Ala., Health Officer, Randolph  
County Health Dept.  
George A. Dame, M.D., Fernandina, Fla.,  
Director, Nassau County Health Dept.  
Walter W. Fenton, M.D., Court House, San  
Bernardino, Calif., Health Officer, San Ber-  
nardino County Health Dept.  
John D. Hamner, Jr., M.D., M.P.H., Ash-  
land, Va., Health Officer, Hanover County  
Health Dept.  
Lyle L. Hassell, M.D., 1412 Donaghey Ave.,  
Conway, Ark., Medical Director, Dist. 4,  
State Board of Health  
E. Alex Heise, M.D., 1420 Hampton St.,  
Columbia, S. C., Health Officer, State Board  
of Health  
Herbert A. Hudgins, M.D., Rutherfordton,  
N. C., Health Officer, Rutherford-Polk  
District  
Ulys Jackson, M.D., Harrison, Ark., Health  
Director, Dist. 15  
Roy A. Kelly, M.D., New Roads, La., Direc-  
tor, Pointe Coupee Parish Health Unit  
Clarence J. Kusunoki, M.D., Board of Health,

Wailuku, Maui, Hawaii, County Health Of-  
ficer, Territorial Board of Health  
Walter S. Lay, M.D., 2320 Whitney Ave.,  
Hamden, Conn., Health Officer  
Norman M. MacLeod, M.D., City Hall, New-  
port, R. I., Commissioner of Health  
Iva G. Murphy, M.D., Eutaw, Ala., Health  
Officer, Greene County Health Dept.  
James E. Peavy, M.D., Sweetwater, Tex.,  
Director, Sweetwater-Nolan County Health  
Unit  
Alva S. Pinto, M.D., 305 City Hall, Omaha,  
Nebr., Health Commissioner  
Warren C. Ramer, M.D., Lexington, Tenn.,  
Director, Henderson-Decatur District Health  
Dept.  
Joseph A. St. Angelo, M.D., 1891 Smith St.,  
North Providence, R. I., Superintendent,  
Health Dept.  
W. Lewis Schafer, Jr., M.D., M.P.H., 27 E.  
Oak St., Alexandria, Va., Health Officer  
Roy J. Settle, M.D., Box 267, Madisonville,  
Tenn., Monroe County Health Officer  
Joseph W. Still, M.D., Medical Center, Green-  
belt, Md., Health Officer, Tennessee Dept.  
of Health  
Henry C. Wilson, M.D., Courthouse, Green-  
ville, Tex., Director, Hunt County Health  
Unit

#### *Laboratory Section*

Elisabeth H. Clayton, R.N., State Board of  
Health, Columbia, S. C., Consultant Nurse,  
Venereal Disease Control  
Theodore Cohn, B.S., Y.M.C.A., Springfield,  
Ill., Bacteriologist, State Dept. of Public  
Health

Marion D. Fleming, B.A., Puunene, Maui, Hawaii, Junior Bacteriologist, Board of Health

J. Emerson Kempf, M.D., 3549 East Medical Bldg., Ann Arbor, Mich., Research Assistant in Virus Diseases, Univ. of Michigan

Adelien, Larson, A.B., Kern General Hospital, Bakersfield, Calif., Bacteriologist, Kern Co. Health Dept.

Henry E. McConnell, B.S., P. O. Box 550, Coeur D'Alene, Ida., Bacteriologist, Kootenai County Health Unit

William Earl Ragsdale, B.A., 1411 C. West 10th St., Austin, Tex., Bacteriologist, Bureau of Laboratories, State Dept. of Health

Clair N. Sawyer, Ph.D., New York University, University Heights, N. Y., Assistant Professor of Sanitary Chemistry and Biology

George O. Tapley, B.S., C.P.H., 411 Washington St., Brookline, Mass., Municipal Bacteriologist, Dept. of Health

#### *Vital Statistics Section*

Kenneth W. Babcock, Ph.D., 7701 Georgia Ave., N.W., Washington, D. C., Statistician, Bureau of Medicine and Surgery, U. S. Navy

Louis S. Reed, Ph.D., National Institute of Health, Bethesda, Md., Senior Economic Analyst, Division of Public Health Methods

Maynard C. Weller, B.S., 161 West Wisconsin Ave., Milwaukee, Wis., Executive Secretary, National Funeral Directors Assn.

Robert H. Woodruff, M.D., State Dept. of Public Health, Springfield, Ill., State Registrar and Chief, Division of Vital Statistics

#### *Engineering Section*

Francis A. Jacocks, B.S., Apt. 19, Village Apts., Chapel Hill, N. C., District Supervisor of Malaria Control, State Board of Health

John P. Lamb, Jr., B.S., C.P.H., 601 Mayes Ave., Sweetwater, Tenn., Sanitarian, State Dept. of Public Health

Svend M. Plum, 2619 Montgomery Ave., Detroit, Mich., Architectural Engineer

George R. Talcott, B.S. in C.E., 1621 Grove Ave., Richmond, Va., Student, Univ. of North Carolina

#### *Industrial Hygiene Section*

Paul J. Bamberger, M.D., P.O. Box 85, Climax, Colo., Medical Director, Climax Molybdenum Co.

Rodney R. Beard, M.D., M.P.H., 2330 Clay St., San Francisco, Calif., Instructor in Public Health and Preventive Medicine, Stanford Medical School

John W. Crosson, M.D., 1810 McClung St.,

Charleston, W. Va., Director, Bureau of Industrial Hygiene, State Health Dept.

Edward C. Hammond, Sc.D., 5402 Connecticut Ave., Apt. 206, Washington, D. C., Asst. Biometrician, Industrial Hygiene Div., National Institute of Health

Kingsley K. Kay, Ph.D., Dept. of Pensions and National Health, Ottawa, Ontario, Canada, Industrial Hygiene Engineer

William R. Retzer, B.S. in Ch.E., City Health Dept., Louisville, Ky., Industrial Hygiene Engineer

Russell B. Robson, M.B., 1309 Windermere Rd., Walkerville, Ontario, Canada, Medical Director, General Motors Corp.

#### *Food and Nutrition Section*

Joseph M. Dennis, B.S. in Ch., Health Dept., City Hall Greensboro, N. C., Sanitary Officer

Jane E. Gorsuch, B.S., 609 Hill St., Ann Arbor, Mich., Nutritionist, Instructive District Nursing Assn.

G. Victor Hallman, M.S., 4645 W. Grand Ave., Chicago, Ill., Bacteriologist, Continental Can Co.

Nathan I. Liss, Ph.G., B.S., 1818 N. Smallwood St., Baltimore, Md., Biochemist-Pharmacologist

Sybil L. Smith, A.B., U. S. Dept. of Agriculture, Office of Experiment Stations, Washington, D. C., Principal Experiment Station Administrator

#### *Maternal and Child Health Section*

Jean P. Egbert, R.N., B.S., 1022 Pearl St., Denver, Colo., Child Health Consultant, State Div. of Public Health Nursing

Helen M. Johnson, M.D., 668 Phelan Bldg., San Francisco, Calif., Medical Director, Cardiac Program, Crippled Children's Services

Marjorie K. Smith, M.D., 1006 E. 11th St., Helena, Mont., Asst. Director, Div. of Maternal and Child Health, State Board of Health

Annie S. Veech, M.D., 2519 Cherokee Parkway, Louisville, Ky., Director, Bureau of Maternal and Child Health, Dept. of Public Health

#### *Public Health Education Section*

James E. Bryan, Ph.B., 171 East Post Road, White Plains, N. Y., Executive Secretary, County of Westchester Medical Society

T. Ione Diggs, A.B., 800 Hayes, Norfolk, Va., Public Educator and Supervisor, Norfolk Public Clinic

Herbert H. Gross, Ph.D., M.A., Concordia Teachers College, River Forest, Ill., Instructor

Barbara E. Kilduff, A.B., M.P.H., 122 Newton Terrace, Waterbury, Conn., Student, Yale Univ.

Shirley Kopelman, 34-30 73rd St., Jackson Heights, L. I., N. Y., Student, Yale Univ.

Arthur E. Morgan, D.Sc., 114 East Whiteman St., Yellow Springs, Ohio, President, Community Service, Inc.

Emmanuel F. Salerno, M.D., 703 Corondelet St., New Orleans, La., Medical Director, Orleans Parish School Board

Edmund P. Wells, A.B., P. O. Box 341, Charleston, W. Va., Acting Executive Secretary, West Virginia Tuberculosis and Health Assn.

Morris S. Wortman, M.S., 507 S. Euclid Ave., St. Louis, Mo., Research Asst., Washington Univ. Clinics and State Health Dept.

#### *Public Health Nursing Section*

A. Pearl Barclay, R.N., 519 Dexter Ave., Montgomery, Ala., Associate in Nursing, State Health Dept.

Margaret Denham, M.A., R.N., 4203 Smithdeal Ave., Richmond, Va., Advisory Nurse, State Health Dept.

Emma M. Kuehlthau, B.S., R.N., 4497 Pershing Ave., St. Louis, Mo., Educational Director, Visiting Nurse Assn.

Margaret J. Lynch, B.S., R.N., Greenwich Lodge, Greenwich, Conn., Executive Director, Visiting Nurse Assn. of Stamford, Conn., Inc.

Amelia M. Meyersieck, R.N., B.S., 295 Golden Hill St., Bridgeport, Conn., Director, Visiting Nurse Assn. of Bridgeport

Edna Knapp Odin, R.N., A.B., 128½ N. New Hampshire Ave., Los Angeles, Calif., Nurse Inspector, Los Angeles City School Dept.

Astrid C. Peterson, R.N., Room 402, Court House, Minneapolis, Minn., Director, Hennepin County Public Health Nursing Service

#### *Epidemiology Section*

Morris N. Davidow, M.D., 5 Elm Hill Ave., Roxbury, Mass., Medical Inspector, Boston Health Dept.

J. Ancheng Miao, M.D., 30 Fenwood Road,

Boston, Mass., Commissioner of Health, Yunnan Provincial Health Administration

#### *Unaffiliated*

West J. Altenburg, M.A., Ph.D., 91 Gladstone, Detroit, Mich., Head, Dept. of Health Education, Board of Education

John L. Barnhart, M.S., Ph.D., 124 Orchard Lane, Stillwater, Okla., Asst. Professor of Dairy Manufacturing, Oklahoma Agricultural and Mechanical College

Stanley K. Bernard, State Board of Health, Columbia, S. C., Field Agent, Div. of Venereal Disease Control

Clifford T. Billingsley, D.M.D., Board of Health Parliament Bldgs., Victoria, B. C., Canada, Director of Preventive Dentistry

David Frost, M.D., 121 Park Drive, Boston, Mass., Student, Harvard School of Public Health

Albert S. Irving, M.D., Medical Arts Bldg., Galveston, Tex., Medical Director, American National Insurance Co.

Kathel B. Kerr, M.S., Sc.D., U. S. Marine Hospital, Bldg. 19, San Francisco, Calif., Zoölogist, State Dept. of Public Health

C. B. Lien, 4353 N. Avondale Ave., Chicago, Ill., President, Lien Chemical Co.

Milton I. Roemer, M.D., 591 E. 27th St., Paterson, N. J., Hospital Intern

#### DECEASED MEMBERS

D. L. Cowden, M.D., Cambridge, Ohio, Elected Member 1920

John B. Hawley, Sc.D., Fort Worth, Tex., Elected Member 1925, Elected Fellow 1938

George H. Hazlehurst, Montgomery, Ala., Elected Member 1913, Elected Fellow 1922

J. L. Pomeroy, M.D., Los Angeles, Calif., Elected Member 1915, Elected Fellow 1925

Peter O. Shea, M.D., Worcester, Mass., Elected Member 1928

William H. Walsh, M.D., Chicago, Ill., Elected Member 1930

Mary H. Westfall, D.D.S., Indianapolis, Ind., Elected Member 1934

Jessamine S. Whitney, New York, N. Y., Elected Member 1907, Elected Fellow 1933

#### CORRECTION

**A**N error exists in the annual report of the Committee on Professional Education on Public Health Degrees and Certificates Granted in the United States and Canada During the Academic Year 1939-1940, published in the December, 1940, issue of the *Journal*. On page 1457 reference is

made to the University of California, and it is stated that graduate courses were discontinued a year ago. Attention is called to the fact that graduate degrees in public health have been offered under the Department of Hygiene, University of California at Berkeley for several years and are still being offered.

## HEALTH CONSERVATION CONTESTS

WINNERS IN THE 12TH ANNUAL CITY HEALTH  
CONSERVATION CONTEST

Baltimore, Md.  
Evanston, Ill.  
Greenwich, Conn.  
Hackensack, N. J.  
Hartford, Conn.  
Honolulu, Hawaii  
Madison, Wis.  
Memphis, Tenn.  
Newton, Mass.  
Pasadena, Calif.

*South Central Division*

El Paso County, Tex.  
Tyler-Smith County, Tex.

*Western Division*

Thurston County, Wash.  
Wasco County, Ore.

## WINNERS IN THE SPECIAL CONTESTS

For the most effective Tuberculosis Control  
programs:

Hartford, Conn.  
Newton, Mass.

WINNERS IN THE 7TH ANNUAL RURAL HEALTH  
CONSERVATION CONTEST*Northeastern Division*

Alcona - Iosco - Ogemaw - Oscoda Counties,  
Mich.  
Alger-Schoolcraft Counties, Mich.

*Eastern Division*

Arlington County, Va.  
Davidson County, Tenn.  
Fayette County, Ky.  
Forsyth County, N. C.

*Southeastern Division*

Coahoma County, Miss.  
Lauderdale County, Miss.  
Pickens County, Ala.  
Pike County, Miss.

For the most effective Syphilis Control  
programs:

Chicago, Ill.  
Louisville, Ky.  
Memphis, Tenn.  
Pasadena, Calif.

These contests are conducted annually by the Chamber of Commerce of the United States with the coöperation of the American Public Health Association. The Rural Health Conservation Contest is financed by the W. K. Kellogg Foundation, and the City Health Conservation Contest and the Special Contests were financed in 1940 by the Metropolitan Life Insurance Company.

## EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

### POSITIONS AVAILABLE

Sanitary Chemist for sewage laboratory in Eastern city. Salary \$2,000. Graduate preferred. Write Box V, Employment Service, A.P.H.A.

Bacteriologist. Alexandria, Va., City Department of Health. Milk, water, serological and general examinations. Salary \$1,200 to \$1,800 according to training and experience. Apply to W. A. Browne, M.D., Health Officer.

Physician with public health training to serve as full-time county health officer in rural South Atlantic area. Salary \$3,600 to \$4,000. Write Box C, Employment Service, A.P.H.A.

Public Health Nurse. General nurse for Alexandria, Va., City Health Department. Must be a graduate of an accredited hospital with special training and experience in public health. Salary \$1,620 to \$1,800 according to qualifications. Apply to W. A. Browne, M.D., Health Officer.

County Public Health Nurses for New Mexico. Must have 4 months post-graduate instruction under one of the recognized public health nursing courses and one year's experience. Must drive and have a car. Address inquiry to State Health Department, Santa Fe, New Mexico.

Director of County Health Unit, large southern metropolitan area over 200,000, duties to include the direction of complete generalized program. Applicant must have M.D., M.P.H., with satisfactory experience in administration and technical phase of public health work. Salary dependent upon experience and training. Opportunity for advancement assured. Box W, A.P.H.A.

### U. S. CIVIL SERVICE COMMISSION

The Commission has announced that applications will be received for positions as Senior Medical Officer (\$4,600), Medical Officer (\$3,800) and Associate Medical Officer (\$3,200), for appointments in the Public Health Service, with the Food and Drug Administration, Veteran's Administration, and the Indian Service. Forms for application may be obtained from the U. S. Civil Service Commission, Washington.

The Commission also announces that applications may be filed for the positions of Public Health Nurse (\$2,000) and Graduate Nurse, general staff duty (\$1,800) in the Indian Field Service, including Alaska. Forms may be obtained from the U. S. Civil Service Commission, Washington.

### POSITIONS WANTED

#### ADMINISTRATIVE

Physician, aged 44, graduate of Rush Medical, completing work at Johns Hopkins for M.P.H. and experienced as director of rural unit, will consider opening. A480

Physician, aged 39, excellent graduate training and experience in public health, specialized in tuberculosis and epidemiology, now employed, will consider position with salary of \$4,500 or better. A473

Experienced physician, graduate University of Illinois, M.P.H. Johns Hopkins 1940, seeks administrative opening suitable to his proven ability. Excellent references. A466

Physician with M.P.H. from Johns Hopkins and 10 years' field experience in responsible position with leading state health department, will consider good opening. A481

Physician, aged 38, M.P.H. Harvard 1932, experienced as director of county units and in state department of health. Will consider administrative position. A474

Physician, graduate of University of Iowa, candidate for Dr.P.H. at Harvard, seeks good administrative position. A476

Physician, M.D. Yale, M.S.P.H. Columbia; also short course for health officers, Vanderbilt. Good clinical background, 3 years' public health experience. Will consider appointment in child health, epidemiology or public health administration. A350

Physician, specialist in maternal and child health. M.D. University of Kansas, M.P.H. Harvard. Excellent background in pediatric residencies, experience in municipal and county health work and as director of maternal and child health in state health departments. Desires



position as director of a state program, as pediatrician, or in school or college health program. A479

Physician, aged 40, M.D. University of Minnesota, C.P.H. and Dr.P.H. Johns Hopkins, experienced in epidemiology and venereal disease control, will consider interesting position. A482

Dentist, University of Pittsburgh, D.D.S., M.P.H. University of Pennsylvania 1941, experienced in practice, wishes an administrative position in public health, preferably at state level. M450

#### HEALTH EDUCATION

Director of Health Education, woman. Knows fields of education and health education. National and state experience in organization, supervision, curriculum building, and teacher education. Now employed but would consider a change. H495

Young woman with Master's degree in Health Education, Teacher's College, Columbia University, and background of clinical laboratory work and biochemistry, seeks position as health educator in research or as laboratory assistant in public health. H494

Health educator with excellent background of teaching experience in schools. M.S.P.H. University of Michigan. Wishes position where skill with educational

sound film projection and other recognized technics will be appreciated. H405

Public health nurse, M.A. Columbia, experienced in teaching health education and public health nursing. Wishes teaching position in college or university summer of 1941. H472

#### LABORATORY

Experienced woman bacteriologist, Ph.D. University of Illinois 1937, wishes position in teaching or research. Excellent bibliography and references. L410

Experienced bacteriologist, young man of 33, Sc.B., who for several years has been in charge of state laboratory doing public health and diagnostic bacteriology, immunology and serology, will consider opening. L427

#### SANITARY ENGINEERING

Engineer, aged 38, 3 years' experience as district sanitary supervisor, state department of health, together with work on plumbing, heating and ventilation, will consider position in the plumbing or heating field or state department of health. Prefers middle western or western states. E453

Engineer with good training and experience in water treatment, sewage plant operation and in research, wishes position as superintendent. Can go anywhere. E422

#### Advertisement

##### NURSE PLACEMENT SERVICE

Anna L. Tittman, R.N., Executive Director

Suite 512, Willoughby Tower, Michigan and Madison Avenues, Chicago, Ill.

*Professionally sponsored. Approved Bureau of N.O.P.H.N. Non Profit No registration fee.*

**ADMINISTRATION:** (a) Working Director; V.N.A.; West Coast; \$1,800. No. 41-0476. (b) Similar to (a); New England. No. 41-0747. (c) Director; Official; Foreign; ability to speak Spanish; degree, P.H.N. certificate; \$3,000-\$4,000. No. 41-0869.

**EDUCATION:** (a) Instructor & Director P.H.N. University Program; \$3,000-\$3,250. No. 41-0903.

**CONSULTATION:** (a) Maternity; State-wide; midwest; \$2,200-\$2,400; No. 41-0610. (b) Similar to (a); Mid-Atlantic; \$2,100. No. 40-2927.

**SUPERVISION:** (a) Generalized; V.N.A.; 13 staff nurses; Mid-Atlantic; \$2,300. No. 41-0864. (b) Health Supervisor; Private; State-wide; East; \$3,000-\$3,600. No. 41-0870.

**SCHOOL:** (a) Supervisor; City Dept. of Education; Midwest; salary open. No. 41-0898. (b) Similar to (a); South. No. 41-0700. (c) One

Nurse; includes formal teaching of high school students; Midwest; No. 40-2248. (d) Resident; private girls school for 275 girls; (50 boarding); Midwest. No. 41-0781.

**ONE NURSE SERVICE:** (a) Community nurse; generalized including school; New England; \$1,800. No. 41-0709. (b) County Nurses; all sections. Salaries \$135-\$150.

**CAMP:** (a) Private; 325 boys; open June 27 to August 31; Midwest; \$100-\$125 & maintenance for season. No. 41-0830. (b) Private; 200 mothers & children; open June 15; Midwest; salary open. No. 41-0739. (c) Private; 80 boys; July 6-Sept. 1; teach class in first aid; \$150 for season. No. 41-0900.

**STAFF:** (a) Generalized; private; New England; \$120-\$125 per month. No. 41-0902. (b) Generalized; private; Southwest; \$144.50. No. 41-0782.

## NEWS FROM THE FIELD

### SUMMER SCHOOL COURSES IN PUBLIC HEALTH

*While the following list does not show all universities and technical schools offering summer courses in public health, it represents those which have replied to a questionnaire sent out by the American Public Health Association.*

#### *Boston University, Boston, Mass.*

July 7–August 16

Personal Hygiene Applied  
Principles of Physical Education  
Current Problems in Health, Physical Education and Recreation  
Methods and Materials of Physical Education for Elementary Schools  
Organization and Administration of Recreation in Rural and Urban Communities  
Organization and Administration of Athletics in Schools and Colleges  
The Psychology of Physical Education  
First Aid, Care and Prevention of Injuries  
Methods and Materials of Physical Education for Secondary Schools  
Research or Directed Study in Physical Education

#### *University of California, Berkeley, Calif.*

June 30–July 19

Institute on School Health Service and Education (for registered nurses):  
Public Health Aspects  
Medical Problems  
Group Discussions

June 30–August 8

General Bacteriology  
Child Development  
Physiology of the Growth and Development in the Child  
Child Psychology  
Public Health Aspects of School Health Service and Education—3 weeks' institute, June 30–July 19—under auspices of University of California and the State Department of Public Health

Introduction to Educational Psychology  
General Psychology  
Elementary Epidemiology \*  
Elementary Public Health \*  
Biochemistry \*

\* These three courses are offered in the Inter-session, May 19–June 27.

#### *University of California at Los Angeles, Los Angeles, Calif.*

June 30–August 8

Elementary Bacteriology  
Growth and Development of the Child  
Adolescence  
Administration of the School Health Program  
Recreational Leadership  
Elements of Nutrition  
Introductory Psychology  
Child Psychology  
Educational Psychology  
Abnormal Psychology  
Public Health and Preventive Medicine  
Principles and Practice of Public Health Nursing  
Social Case Work as Related to Public Health Nursing  
General Human Physiology  
General Zoölogy  
Endocrinology  
Social Institutions  
The Family  
Counseling in the Secondary Schools  
Mental Hygiene  
Child Guidance  
Community Control of Syphilis and Gonorrhea  
Safety Education

*The Catholic University of America,*  
Washington, D. C.

June 27–August 9

Child Study  
Nursing Education  
Public Health Nursing  
Social Work  
Sociology

*Colorado State College of Education,*  
Greeley, Colo.

June 16–August 8

Courses in Nursing Education:

Curriculum and Principles of Teaching  
Ward Management and Ward Teaching  
Teaching of the Nursing Arts  
Trends in Nursing Education  
Administration in Schools of Nursing

*Teachers College, Columbia University,*  
New York, N. Y.

July 7–August 15

Administration of Health Education in Public Schools; Principles and Current Problems in Health Education; Methods and Materials of Health Instruction in Schools and Colleges

Health Education

Health and Physical Education

Recreation

Health Care of Children

Nutrition and Health

Personal and General Hygiene

Public Health Nursing

Public Health Administration

School Hygiene

School Nursing

Education of the Exceptional:

Demonstration Classes

Observation, Practice Teaching, and Special Clinical Work

Curriculum

Survey of Ear, Orthopedic, Cardiac, and Certain Tuberculous Conditions, and of Certain Types of Malnutrition

Education of the Blind and Partially Sighted

Education of the Deaf (advanced courses only), and of the Hard of Hearing (beginning and advanced courses)

Education of the Motor Handicapped

Education of the Mentally Handicapped

Education of the Socially Handicapped  
Psychology of Physically and Mentally Handicapped Children

Motors and Rhythms for the Handicapped

*Cornell University, Ithaca, N. Y.*

July 7–August 15

Health Education:

The School Health Program

Mental and Physical Health Problems of the School Child

Mental Hygiene

*Duke University, Durham, N. C.*

June 10–July 21

Materials and Methods in Health Education

Mental Hygiene of the School Child

Personal and School Hygiene

*Harvard University—Medical School,*  
Boston, Mass.

June 18–August 1

Physiotherapy (course for graduates)

*Harvard University—School of Public Health,* Boston, Mass.

May 1–July 31

Lecture and laboratory courses in Industrial Hygiene (for physicians and engineers)

*The University of Hawaii, Honolulu, Hawaii*

June 30–August 8

The Teacher in Relation to School Health  
Fundamentals of Health and Disease

*University of Illinois, Urbana, Ill.*

June 16–August 9

Bacteriology:

Introductory Bacteriology and Sanitary Science

Epidemiology

Food and Microbiology

Chemistry:

Biochemistry

Entomology:

Life and Importance of Insects

Home Economics:

Nutrition

Dietetics

Foods

Organization and Management of the Home

The Child and His Development

Physical Education for Men:

Physical Education

Problems in Physical Education

Problems in School Health

Problems in Public Health

Philosophy of Sport  
 Recreation Leadership  
 Safety Education  
 Training and First Aid  
 Physical Education for Women:  
   Physical Education  
   Physical Education Program for the High School  
   Playground Activities for Elementary Schools  
   Health Education in the High School  
 First Aid  
 Community Recreation  
 Social Administration:  
   Community Welfare Organization  
   Social Effects of Poverty

*State University of Iowa, Iowa City, Iowa*

June 9–August 1

Personal and Community Hygiene  
 School Hygiene  
 Problems in Water and Sewage Examinations  
 Advanced Hygiene  
 Physical Education Activity Courses  
 Methods and Principles of Physical Education  
 Tests and Measurements in Physical Education  
 Techniques of Research in Physical Education  
 Correctives and Corrective Clinic  
 Curriculum in Physical Education  
 Administration of Physical Education  
 History of Physical Education  
 Trends in Recreation  
 Administration of Recreation  
 Co-Recreational Activities  
 Crafts in the Recreation Program  
 Growth and Development  
 Seminar  
 Problems  
 Thesis

*Loyola University (School of Medicine), Chicago, Ill.*

June 23–August 2

Organization and Administration in Public Health Nursing  
 Public Health Nursing in Special Fields  
 Community Hygiene and Epidemiology  
 Methods and Materials in Health Education  
 Physiologic Hygiene  
 School Health Problems  
 Public Health Seminar  
 Applied Public Health Nutrition  
 Child Welfare  
 Public Health Statistics

Public Health Law  
 Principles of Social Case Work  
 Principles of Orthopedic Nursing  
 Advanced Vital Statistics  
 Field Work in Public Health Nursing  
 Field Work in Social Case Work  
 Educational Psychology

*Marquette University, Milwaukee, Wis.  
 College of Nursing*

June 23–August 1

Principles of Public Health Nursing I and II  
 Ward Administration  
 Ward Teaching  
 Professional Problems  
 Professional Ethics  
 Introduction to Nursing Education I and II  
 Principles and Methods of Teaching  
 Advanced Nutrition  
 Teaching the Elementary Nursing Course

*Massachusetts Institute of Technology, Cambridge, Mass.*

Bacteriology (June 16–July 3)  
 Public Health Bacteriological Methods (June 30–July 18)  
 Food Technology (June 30–July 18)  
 Four Year Summer Program leading to C.P.H.  
 Second Summer—June 30–August 20, 1941  
 Health Education  
 Pathology  
 Personal Hygiene and Applied Nutrition  
 Public Health Engineering Program—June 16–July 25

*Massachusetts Institute of Technology, Cambridge, Mass.*

June 16–July 25

Public Health Engineering:  
 Civil and Military Sanitation  
 Sanitary Bacteriology  
 Sanitary Biology  
 Sanitary Chemistry

*Michigan State College, East Lansing, Mich.*

June 24–August 1

General Bacteriology  
 Medical Biology Courses  
 Pathological Bacteriology  
 Personal Hygiene  
 Industrial Hygiene  
 Physical Education Departments offer the following courses:  
 School Health Problems  
 First Aid

*University of Michigan, Ann Arbor, Mich.*

June 30–August 8

For Undergraduates and Graduates

General Hygiene and Public Health  
Child Hygiene  
Public Health Statistics (Undergraduate)  
School Health Program  
Principles of Public Health Nursing  
Special Field in Public Health Nursing  
Nutrition  
Methods and Materials in Health Education  
Tuberculosis  
Sex Education and Hygiene  
Eye Hygiene  
Mental Hygiene  
Public Health Aspects of Social Case Work  
Physiologic Hygiene (Undergraduate)  
Communicable Diseases and Epidemiology (Undergraduate)  
The Public Health Nurse in the Orthopedic Program  
The Public Health Nurse in the Syphilis Program  
Physiologic Hygiene (Graduate)  
Communicable Diseases and Epidemiology (Graduate)  
Public Health Statistics (Graduate)  
Public Health Law and Administration  
Sanitation  
Industrial Hygiene  
Race Hygiene  
Seminars in Public Health  
Research in Public Health  
The School Physician

*Mills College, Oakland, Calif.*

June 29–August 8

Child Development  
Group-Work for Recreation Leaders  
Home Economics  
First Aid

*University of Minnesota, Minneapolis, Minn.*

First Term, June 16–July 25

Second Term, July 28–August 29

First Term.

Elements of Preventive Medicine and Public Health  
Field Practice with Family Health Agency  
Selected Health Problems  
Research in Public Health

Public Health Administration and Field Work  
Environmental Sanitation—General  
Public Health Administration  
Research  
Biometric Principles  
Biostatistics Laboratory  
Topics in Biostatistics

Second Term:

Tuberculosis and Its Control  
Mental Hygiene  
Principles of Public Health Nursing  
Field Practice with Family Health Agency  
Special Methods and Supervised Practice in Health Education for Public Health Nurses  
Public Health Administration and Field Work  
Supervision in Public Health Nursing  
Advanced Problems in Public Health Nursing  
Research

*National Society for the Prevention of Blindness, 1790 Broadway, New York, N. Y. (in coöperation with the following colleges and universities)*

Courses for the Training of Teachers and Supervisors of Sight-Seeing Classes:  
*State Teachers College, Buffalo, N. Y.*  
Advanced Course, July 7–August 15  
*Wayne University, Detroit, Mich.*  
Elementary Course, June 23–August 2  
*Western Reserve University, Cleveland, Ohio,* June 23–August 2  
Advanced Course

Course in Sight Conservation for Nurses:

*University of Minnesota, Minneapolis, Minn.,* June 16–July 25  
Advanced Course, June 17–July 26

*New Jersey State Teacher's College, Montclair, N. J.*

July 7–August 13

Administration  
Biology  
Guidance  
Personnel Problems  
Philosophy of Education  
Physical Education  
Psychology and Mental Hygiene  
Research and Technique  
Sociology  
Techniques of Education  
Tests and Measurements  
Health and Health Teaching

*University of New Mexico, Albuquerque, N. M.*

June–August

Social Hygiene  
Health Education  
Contagious Diseases of Children  
First Aid

*New York School of Social Work, New York, N. Y.*

June 17–August 29

Social Work Courses and Institutes  
Community Health Problems  
Field Work

*New York University, New York, N. Y.  
School of Education*

Intersession, June 3–27

Administration of Public Health

Summer Session, July 1–18

Principles of Public Health Nursing I  
Organization of School Nursing I  
Teaching of Home Nursing and Child Care I

Social Agencies and Their Relation to the Public Health Nursing Program

Methods of Ward Management

Principles and Methods of Teaching in Nursing Education

Other courses in Nutrition

The Living Organism I

Psychology of Childhood

Psychology of Adolescence

Summer Session, July 21–August 8

Principles of Public Health Nursing II

Organization of School Nursing II

Teaching of Home Nursing and Child Care II

Teaching Activities of the Public Health Nurse

Methods of Ward Teaching

Supervision in Hospitals

Other courses in Nutrition

The Living Organism II

Psychology of Childhood

Psychology of Adolescence

July 1–August 8

Orthopedic courses offered at Lake Sebago:

A Survey of Physical Defects in Children

Practicum in Rehabilitation of Orthopedic Defects

Adaptation of Physical Education Activities for the Atypical Individual

*Northwestern University, Evanston and Chicago, Ill.*

June 23–August 16

Teaching Rhythms to Children  
Problems in Physical Education  
Methods of Teaching Health in Secondary Schools

Advanced Physiology of Physical Activity  
Mental Hygiene in Teaching  
Child Development

Psychological Development of Adolescents  
Physical and Health Education for Administrators

Social Aspects of Play

*University of Pennsylvania, Philadelphia, Pa.*

June 30–August 12

Nursing Education:

Public Health Nursing

Physical Education:

Principles of Health Education

*Rutgers University, New Brunswick, N. J.*

June 30–August 8

Public Health Practice

Principles of Public Hygiene

*Springfield College, Springfield, Mass.*

July 7–August 9

Health and Physical Education for Atypical Children

Organization of Health, Safety and Physical Education

Tests and Measurements in Health and Physical Education

Physical and Health Inspection

Safety Education—First Aid and Athletic Injuries

*Smith College—School for Social Work, Northampton, Mass.*

July 2–August 27

Medical Information

*Stanford University, Stanford University, Calif.*

June 23–August 30

Physical Education and Hygiene

*Stanford University Medical School,*  
San Francisco, Calif.

June 23–July 18

Advanced Kinesiology  
Psychology of the Invalid and the Handicapped  
Therapeutic Gymnastics  
Skeletal Muscle and Motor Activity in Health and Disease  
Study of a Special Problem in Physical Therapy

*Syracuse University, Syracuse, N. Y.*

July 7–August 15

Principles of Public Health Nursing  
Special Fields in Public Health Nursing  
Case Studies in Public Health Nursing  
Psychology (Child, Adolescent, Educational)  
Nutrition  
Hygiene Methods  
Mental Hygiene  
Public Health and Statistics  
Methods of Teaching in Public Health Nursing

*Temple University, Philadelphia, Pa.*  
Teachers College, Department  
of Physical and Health Education

July–August

Educational Hygiene  
Administration of Health Education  
Orthopedics  
Safety Education

*University of Utah, Salt Lake City,*  
Utah

June 16–July 23

Biology  
Chemical Research  
Problems in Child Development  
Guidance and Personnel in Secondary Schools  
Physical Education and Hygiene  
Home Economics  
Social Work  
Introduction to Public Health (Sanitation)  
Personal Health and Its Teaching  
Principles of Child Welfare  
The Child and the Curriculum  
Activities in the Kindergarten

Guidance of High School Girls  
School Discipline—causes of problem behavior  
Recreational Physical Activities

*Vassar College, Poughkeepsie, N. Y.*

June 19–July 31

Institute of Euthenics:  
Child Development, Family Relationships, and Guidance  
Home Management  
Economic Problems of the Consumer

*University of Virginia, University, Va.*

June 16–July 26

First Term:  
School Hygiene and Sanitation  
Second Term:  
Physical Welfare of the Child

*Wagner College, Staten Island, N. Y.*

June 9–July 19

Bacteriology  
Applied Bacteriology  
Serology  
Clinical Pathology  
Seminar in Medical Technology

*Washington University, St. Louis, Mo.*

June 16–July 25

Education  
Natural Sciences  
Physical Education and Hygiene  
Psychology  
Sociology and Social Work

*University of Washington, Seattle,*  
Wash.

June 18–July 18 (First Term)  
July 21–August 20 (Second Term)

Diagnosis in Education  
Behavior as an Expression of Health  
Nutrition for Public Health Nurses  
Fundamentals of Nutrition  
Bacteriology  
Special Fields of Public Health Nursing  
Public Health Administration and Epidemiology  
Principles of Teaching Nursing and Health  
Methods and Materials in Health Teaching  
School Health Program  
Public Health Program  
Personal and General Hygiene  
Introduction to Public Health Nursing

*Western Reserve University—School of  
Nursing, Cleveland, Ohio*

June 23–August 1

Principles and Methods of Teaching in  
Nursing  
Ward Management and Teaching  
Public Health Nursing II  
Principles of Public Health  
Child Development  
Teaching of the Nursing Arts

*West Virginia University, Morgantown,  
W. Va.*

June 11–August 26

Advanced Public-School Health  
Administration of Physical Education  
Safety Education  
Administration of Public Recreation  
Adaptation and Evaluation of Activities in  
Physical Education  
Principles and Program of Physical Educa-

tion in the Elementary Schools  
Modern Trends and Principles of Physical  
Education

*University of Wisconsin, Madison, Wis.*

June 30–August 8

Curriculum in Physical Education for  
Secondary Schools  
First Aid and Safety Education  
Health Education in Schools  
Human Anatomy  
Medical Bacteriology  
Physical Examinations and Therapeutics  
Play, Recreation and Leisure Time Problems  
Physical Therapy  
School Health and Hygiene  
Therapeutic Gymnastics  
The Extra-curricular Physical Education  
Program in the Public Schools  
Physical Education for Elementary and  
Secondary Schools  
Physical Examinations

NATIONAL DEFENSE

DR. THOMAS PARRAN, Surgeon General of the U. S. Public Health Service, announced on April 6 that the public health facilities in the State of Maryland around military and industrial plants will become a field training area for the federal service's new personnel. The public health reinforcements in the form of physicians, engineers, nurses, laboratory technicians and equipment from the Public Health Service will be used in other states which have defense areas, but the training will be done in Maryland as a part of an augmented public health program authorized by Congress in connection with national defense.

Areas in Maryland where the state public health service is to be federally reinforced are the counties of Baltimore, Anne Arundel, Hartford, Prince Georges, and Howard and Baltimore City.

Dr. L. B. Byington of the Public Health Service has been appointed deputy state health officer and deputy city health officer for Baltimore and will serve as liaison agent between the state

and federal services. Directly linked with this augmented Maryland defense health program is the training course in public health for new personnel of the Public Health Service which began April 7, at the National Institute of Health, Bethesda, Md. Physicians, engineers, nurses, and laboratory technicians selected from the Civil Service lists will be given intensive 6 weeks courses in public health administration, communicable disease control, local public health problems, laboratory technics, food and milk sanitation, industrial hygiene, and venereal disease control.

The Public Health Service staff in charge of the course is headed by Senior Surgeon M. V. Ziegler, Mary J. Dunn, Nursing Consultant, Sanitary Engineer E. S. Tisdale, and professors from leading university schools of public health. The final 2 weeks of the course will be spent in the field. It is expected that successive 6 weeks' courses will be given at the Institute until the personnel provided for under the emergency health and sanitation program has been recruited and trained.



## A MEDICAL COLLEGE CELEBRATES

NEW YORK University's College of Medicine celebrated its hundredth anniversary on March 21. The College was established at a time when medical education in this country was on a low plane, and it was a pioneer in introducing the more rigorous discipline of the French schools, then the finest of their kind in the world. Also, its affiliation with Bellevue Hospital Medical College, which it eventually absorbed, strengthened its early position. Its faculty has included such eminent men as Valentine Mott, John W. Draper, Lewis A. Sayre, Austin Flint, William H. Welch. Among its 11,000 graduates are such conspicuous figures as Walter Reed, W. C. Gorgas, Herman H. Biggs, and Joseph Goldberger.

## N.O.P.H.N. RECORD FORMS AVAILABLE

THE Nursing Records Committee of the National Organization for Public Health Nursing has announced that record forms, as revised by the Nursing Records Committee, are now available. Included among the new records are: The Family Folder, Family Data Sheet, Morbidity Record, Child Health Service Record, and a General Health Supervision Record. The N.O.P.H.N. announces that these forms may be purchased from Mead and Wheeler, 1022 South Wabash Avenue, Chicago.

## WPA HEALTH PROGRAM TO BE EXPANDED

EXPANSION and redirection of all community service programs of the Works Projects Administration toward activities related to home defense will include widening of the public health program, according to an announcement. Training of as many as 50,000 persons in the next 12 months as ward attendants, orderlies, and hospital aides capable of giving simple bedside care will be one feature of the program. At present the public health program is

devoted to assisting public hospitals, clinics, and sanatoria. The school lunch program, which now provides hot lunches for approximately 2 million school children, as well as the gardening and food preservation projects, will also be strengthened.

## DIVISION OF INDUSTRIAL HYGIENE REORGANIZES

A GENERAL reorganization of the Division of Industrial Hygiene of the National Institute of Health, Washington, D. C., is announced in order to meet the greater needs of the present and future program in national defense. Two sections, based on the major activities of the division, and three units, which function as service supply to the two sections, but which also have certain non-related functions, have been established. The new organization is as follows:

- J. G. Townsend, M.D., Medical Director, Chief of the Division of Industrial Hygiene States' Relations and National Defense Activities Section—Chief, Sanitary Engineer J. J. Bloomfield
- Research Section—Chief, Surgeon P. A. Neal, M.D.
- Medical Unit—Chief, P. A. Surgeon W. C. Dreesen, M.D.
- Engineering Unit—Chief, P. A. Sanitary Engineer (R) A. D. Brandt, Sc.D.
- Statistical Unit—Chief, Senior Statistician W. M. Gafaer, D.Sc.

## CANCER RESEARCH GRANTS ANNOUNCED

GRANTS totaling \$23,800 to institutions engaged in cancer research have been announced by the National Advisory Cancer Council. The grants have been allotted as follows: Meharry Medical College, Nashville, Tenn., \$1,100 for maintenance of clinical records for statistical analysis; Jackson Memorial Laboratory, Bar Harbor, Me., \$15,000 for research into genetics of cancer; Barnard Free Skin and Cancer Hospital, St. Louis, Mo., \$5,000 for study of changes in cancer cells; American Registry of Pathology. Army

Medical Museum, Washington, D. C., \$1,000 for collection and registry of pathological specimens; Cornell University Medical College, New York City, \$2,700 for study of "Butter yellow" liver tumors of rats.

DR. SALADRIGAS DIRECTS FINLAY  
INSTITUTE IN HAVANA

THE President of the Republic of Cuba, on nomination of the Minister of Health, has appointed Dr. Enrique Saladrigas as Director of the Finlay Institute, Havana. Dr. Saladrigas has announced that it is intended completely to reorganize the Institute and to encourage close coöperation with similar Institutes in other countries in order to promote its program in the field of tropical disease and medical research.

THE NATIONAL DENTAL HYGIENE  
ASSOCIATION

THE National Dental Hygiene Association was incorporated in the District of Columbia, June 12, 1940, as a philanthropic non-profit corporation for the advancement of dental health for the American people. The Martha M. Hall Foundation of New York has sponsored the project and has made a grant of funds to carry the basic expenses of an educational program for an initial period of years. Headquarters of the association are in the Shoreham Building, Washington, D. C.

The association officers include James J. Morgan, President, and Chairman of the Board of Directors of the Martha M. Hall Foundation, and Randolph G. Bishop as Secretary.

The association has declared as its purpose the encouragement of socially minded persons in dental health to the end that they will give support to community programs and aid in the advancement of dental health for all the people. In the development of its program the National Dental Hygiene

Association expects to coördinate its efforts with the American Dental Association and its component societies, and with the health programs being conducted by state health departments. A National Advisory Committee is being formed. Though the association does not contemplate making financial grants for local service and educational programs, it does expect to give other aid to communities in the development of facilities for adequate dental health programs.

NATIONAL TECHNOLOGICAL CIVIL  
PROTECTION COMMITTEE

A NATIONAL Technological Civil Protection Committee has been appointed by the Honorable Henry L. Stimson, U. S. Secretary of War, consisting of the following members representing their respective specialty groups:

Walter D. Binger, Chairman, American Society of Civil Engineers  
W. H. Carrier, American Society of Heating and Ventilating Engineers  
Frederick G. Frost, American Institute of Architects  
E. M. Hastings, American Railway Engineering Association  
Harry E. Jordan, American Water Works Association  
W. Cullen Morris, American Gas Association  
John C. Parker, American Institute of Electrical Engineers  
Arthur B. Ray, American Institute of Chemical Engineers  
Scott Turner, American Institute of Mining and Metallurgical Engineers  
James L. Walsh, American Society of Mechanical Engineers  
Abel Wolman, American Public Health Association  
A contact member of the War Department

Although without any official authority, this committee is organized for the study of defense especially as it relates to public utilities, public services, etc. Publications on "Protective Construction" on "Gas Defense" on "Blackout," and on "Fire Protection" are being sponsored by the committee.

## DR. VAUGHAN RETIRES IN DETROIT

**HENRY F. VAUGHAN, Dr.P.H.,** retired on April 15 as Commissioner of Health of Detroit, Mich., after service with the department since January, 1919, to become associated with the School of Public Health at the University of Michigan, Ann Arbor.

The Detroit Board of Health has announced that, effective April 15, Bruce H. Douglas, M.D., has been made Commissioner of Health to succeed Dr. Vaughan; Joseph G. Molner, M.D., M.P.H., Deputy Commissioner and Medical Director; and Garner M. Byington, M.D., Dr.P.H., Director of Child Welfare and School Health Service.

Dr. Douglas, who has been Acting Superintendent of the Herman Kiefer Hospital and Tuberculosis Controller for the Department of Health, is a graduate of Rush Medical College in 1920. Dr. Molner, since July 1, 1938, has served as Deputy Commissioner of Health and Director of School Health Service in Detroit. He is a graduate of the Wayne University College of Medicine in 1935 and of Johns Hopkins School of Public Health, Baltimore. Dr. Byington has served as physician in charge of medical relations and post-graduate instruction in the department and was particularly concerned with the tuberculosis case finding and the diphtheria prevention activities. He is a graduate of the Wayne University College of Medicine in 1911.

## MEDICAL ADMINISTRATION SERVICE

**DR. KINGSLEY ROBERTS,** of New York, has announced the incorporation of Medical Administration Service, 1790 Broadway, New York, N. Y., to provide technical assistance in the development of new or existing health services, with special reference to medical and hospital care, and to make analyses and studies of the problems of preventive and curative

medicine as they relate to the community. The service is a non-profit, advisory group ready to assist in applying "the engineering approach to problems of health care." Experts and consultants in medical care, hospital administration, industrial medicine, statistical evaluation, hospital and clinic design, and related subjects are an integral part of the organization.

Among the names listed on the sponsoring committee are: Ernst P. Boas, M.D., Carl E. Buck, Dr.P.H., Hugh Cabot, M.D., Michael M. Davis, Ph.D., Dorothy Deming, R.N., Alta E. Dines, R.N., John P. Peters, M.D., G. Canby Robinson, M.D., Henry E. Sigerist, M.D., and C.-E. A. Winslow, Dr.P.H.

## ST. LOUIS COUNTY, MISSOURI, AWARD

**LEONARD M. BOARD,** Public Health Engineer and Director of the Division of Sanitation of the St. Louis County Health Department, Missouri, recently received the civic award of the St. Louis County Junior Chamber of Commerce.

The award is made annually to a young man under age 35 making the most outstanding civic contribution to the County. The citation called attention to Mr. Board's efforts in improving public health conditions in St. Louis County.

## LOUISIANA REORGANIZES BOARD OF HEALTH

**I**N connection with the reorganization of the Louisiana State Board of Health, the Bureau of Sanitary Engineering has been changed to Division of Public Health Engineering. The personnel and activities have been expanded to include work formerly done under other divisions of the Board; for example, Food and Drug Administration, Milk Sanitation and Environmental Sanitation (WPA Community Sanitation Projects). J. W. Forbes, formerly with the Montana State Board

of Health, has been appointed Head of the Food and Drug Section, and H. G. McAndrews, formerly with the Kentucky State Board of Health, has been appointed to head the Milk Sanitation Section.

#### POUGHKEEPSIE-DUTCHESS COUNTIES ASSOCIATIONS MERGE

IT has been announced that the Poughkeepsie Committee on Tuberculosis and Public Health and the Dutchess County Health Association of the State Charities Aid Association have merged. The enlarged County Association will continue to direct its coöperative efforts toward the control of tuberculosis and syphilis. The Poughkeepsie Children's Health Camp, operated for many years by the Poughkeepsie Committee as the agent of the local Lodge of Elks, will be discontinued.

JOHN LARABEE POMEROY, M.D.

DR. JOHN L. POMEROY, Health Officer of Los Angeles County, died on March 24 at the age of 57. In the 26 years of his administration, he built the personnel of the department from 3 to 465. In 1925 he began the development of health centers in the County. The newest, the twelfth, was opened last month. Dr. Pomeroy was elected to membership in the Association in 1915, to Fellowship in 1925, and would have completed a second term as a member of the Governing Council this year. He was President of the Western Branch in 1934.

#### TYPHOID CARRIER REGISTER IN NEW YORK STATE

AT the close of 1940, as announced by the *New York State Health News*, a total of 434 typhoid carriers, exclusive of those in state institutions, were under supervision in upstate New York. Thirty-seven new carriers were added and 25 were removed from the register during the year. Twenty-eight

were discovered as a result of epidemiological investigation of sporadic cases of typhoid, 1 by means of release cultures, 1 as a result of routine food handler examination, and 2 were discovered accidentally at time of cholecystectomy. Of the 25 carriers whose names were removed from the register, 15 have died. Six were released from restrictions after the submission of the required number of negative fecal and duodenal specimens following their cholecystectomy.

#### PERSONALS

##### Central States

THOMAS E. CAMPER, M.D.,\* formerly of Stambaugh, Mich., has been appointed director of the Shiawassee County Health unit, with offices in Corunna. He has been succeeded as director of the Iron County Health Department by DR. LORIN E. KERR, JR.\*

WILBERT W. LAWRENCE, M.D., Norwalk, Ohio, has been appointed Health Officer of Huron County to succeed DR. ROBERT P. SCOTT, JR., who has left for military service.

ALEXANDER S. MACK, M.D., Oak Harbor, Ohio, has been appointed Health Officer of Ottawa County to serve during the absence of DR. CYRUS R. WOOD, Port Clinton, who is in military service.

THEODORE S. SCHULDT, M.D., Piercetown, Ind., has been named Health Officer of Kosciusko County, filling the unexpired term of DR. MAX D. GARBER, Warsaw, who resigned to do research work at Johns Hopkins Hospital, Baltimore.

HARRY G. SOUTHARD, M.D., Marysville, Ohio, has been appointed Health Commissioner of Hocking County.

\* Fellow A.P.H.A.

† Member A.P.H.A.

## Eastern States

J. BURNS AMBERSON, JR., M.D., was elected president of the New York Tuberculosis and Health Association by unanimous vote of the board of directors of the 39th annual meeting. He takes the place of Dr. I. OGDEN WOODRUFF who has served the association as president for six years. JOHN E. GORDON, M.D.,<sup>†</sup> Professor of Preventive Medicine and Epidemiology, Harvard Medical School, Boston, and now in charge of the Red Cross-Harvard University Hospital recently established in England, has been appointed United States liaison officer with the British Ministry of Health.

EDWARD S. ROGERS, M.D.,<sup>†</sup> who was formerly Director of the Bureau of Pneumonia Control of the New York State Department of Health, has been appointed Assistant Commissioner for Medical Administration, effective March 1.

FRANCIS O. SCHMIDT, PH.D., Rebstock Professor of Zoölogy, Washington University, St. Louis, has been appointed Professor of Biology in charge of the program in biologic engineering at the Massachusetts Institute of Technology.

W. F. WILLCOX, Professor, of Ithaca, N. Y., celebrated his eightieth birthday on March 22, receiving many greetings from friends.

## Western States

HERALD R. COX, Sc.D., principal bacteriologist of the U. S. Public Health Service, Hamilton, Mont., was presented with the 1940 Theobald Smith award in medical science, during the recent meeting of the American Association for the Advancement of Science in Philadelphia.

M. F. SCHAFER, M.D., has been appointed Director of the El Paso County Health Unit, Colorado

Springs, Colo., to succeed Dr. THOMAS D. MENSER,\* who has resigned to enter private practice in Trinidad, Colo. Dr. Schafer has interrupted his course at the University of Michigan to accept the appointment.

ANTON C. SIBILSKY, M.D.,\* formerly of Laurium, Mich., has been appointed in charge of the North Central Idaho Health Unit, succeeding Dr. HUGH F. STANTON.

## Southern States

ARCHIBALD M. GAULOCHER, M.D., a graduate of Columbia University and of the College of Physicians and Surgeons, New York, N. Y., has been added to the staff of the Alabama State Department of Health as associate in charge of its Division of Mental Hygiene. The Division of Mental Hygiene will be a unit of the Bureau of Hygiene and Nursing.

C. F. McCLINTIC, M.D., of Williamsburg, W. Va., has been appointed State Health Officer, succeeding Dr. A. E. McCLUE.

JAMES P. MOON, M.D., Dyersburg, Tenn., Health Officer of Dyer County, has been appointed Health Officer of Franklin County to succeed the late Dr. VICTOR J. GANEY.

OREN A. OLIVER, D.D.S., Nashville, Tenn., and Dr. JOHN R. THOMPSON, JR., Jackson, were recently appointed members of the state public health council for three year terms.

## Foreign

DEMETRIO CASTILLO, M.D.,\* Valencia, Venezuela, has been appointed Health Officer, succeeding Dr. ARREAZA GUZMAN, who has been transferred to Maracaibo.

\* Fellow A.P.H.A.

† Member A.P.H.A.

## DEATHS

LOUIS RESNICK, Director of Industrial Relations of the National Society for the Prevention of Blindness, New York, N. Y., died March 18.

GEORGE HALL HAZLEHURST,† Chief Engineer and Director of the Bureau of Sanitation, Alabama Health Department, died March 8 at Mont-

gomery, Ala. He had been with the Alabama State Department of Health since 1917.

HENRY L. K. SHAW, M.D., first Director of the Division of Maternity, Infancy and Child Hygiene of the New York State Department of Health and practising pediatrician of Albany, N. Y., died on March 26.

## CONFERENCES AND DATES

American Association for the Advancement of Science. Durham, N. H. June 22-27.

American Association of Social Workers. Delegate Conference. Philadelphia, Pa. May 30-31.

American College of Surgeons. Hotel Statler, Boston, Mass. November 3-7.

American Home Economics Association—34th Annual Meeting. Stevens Hotel, Chicago, Ill. June 22-26.

American Hospital Association. Atlantic City, N. J. September 15-19.

American Library Association. Annual Meeting. Boston, Mass. June 19-25.

American Medical Association—92nd Annual Meeting. Cleveland, Ohio. June 2-6.

American Optometric Association—44th Annual Congress. Ambassador Hotel, Atlantic City, N. J. Week of June 29.

American Physiotherapy Association—20th Annual Conference. Asilomar, Pacific Grove, Calif. July 13-18. (Graduate Program in Physical Therapy, sponsored by the American Physiotherapy Association. Stanford University Medical School, San Francisco, Calif. June 23-July 18.)

American Public Health Association—70th Annual Meeting. Convention Hall, Atlantic City, N. J. October 14-17.

American Society of Heating and Ventilating Engineers—Summer Meeting. San Francisco, Calif. June 16-20.

American Society of Planning Officials. National Conference on Planning, in coöperation with American Institute of Planners, American Planning and Civic Association, National Economic and Social Planning Association. Philadelphia, Pa. May 11-14.

American Water Works Association—61st Annual Convention. Royal York Hotel, Toronto, Ont., Can. June 22-26.

Pacific Northwest Section—Olympic Hotel, Seattle, Wash. May 8-10.

Southeastern Section—Charleston, S. C. May 12-14.

Ohio Section—Gibson Hotel, Cincinnati, Ohio. May 15-16.

Montana Section—Hotel Florence, Missoula, Mont. May 23-24.

Western Pennsylvania Section—Erie, Pa. August 7-9.

Rocky Mountain Section—LaFonda Hotel, Santa Fe, N. M. September 18-19.

Michigan Section—Grand Rapids, Mich. September 24-26.

Minnesota Section—Minneapolis, Minn. October 9-11.

Southwest Section—Fort Worth, Tex. October 13-16.

California Section—Fresno, Calif. October 22-25.

Kentucky-Tennessee Section—Nashville, Tenn. October 27-29.

Missouri Valley Section—Cedar Rapids, Iowa. October 20-22.

North Carolina Section—Sheraton Hotel, High Point, N. C. November 3-5.

Four States Section—Baltimore, Md. November 6-7.

Civil Service Assembly:

Eastern Regional Meeting, Washington, D. C. 3rd week in May.

Central Regional Meeting, Chicago, Ill. May 15-17.

Western Regional Meeting, Los Angeles, Calif. May 26-28.

Colorado Public Health Association. La Junta, Colo. May 9-10.

Conference of State and Territorial Health Officers of North America. Washington, D. C. Tentative date: Week of April 28.

Dairy Industries Exposition. Concurrent with annual convention of the International Association of Milk Dealers, and the International Association of Ice Cream Manufacturers. Automotive Building, Canadian National Exhibition. October 20-25.

Florida Public Health Association. Orlando, Fla. December, 1941.

Food Conference—under the auspices of the

- Institute of Food Technologists. Pittsburgh, Pa. June 16-18.
- Group Health Federation of America—Third Annual Convention. Los Angeles, Calif. June.
- Heating, Piping & Air Conditioning Contractors National Association. San Francisco, Calif. June 16-20.
- Idaho Public Health Association. Lewiston, Ida. October 6-7.
- Institute of Government. University of Southern California, Los Angeles, Calif. June 9-14.
- International Association of Public Employment Services. Denver, Colo. June 2-5.
- Iowa Public Health Association. Des Moines, Ia. May 8-9.
- Michigan Public Health Association. Grand Rapids, Mich. November 12-14.
- Missouri Public Health Association. St. Louis, Mo. May 15-17.
- National Association of County Officials. Louisville, Ky. May 14-17.
- National Association of Purchasing Agents—Governmental Group. Chicago, Ill. May 26-29.
- National Conference of Social Work. Atlantic City, N. J. June 1-7.
- National Education Association. Boston, Mass. June 29-July 3.
- National Foundation for Infantile Paralysis—Medical Committees. Semi-annual Meeting. Foundation Office, 120 Broadway, New York, N. Y. May 15.
- National Tuberculosis Association. 37th Annual Meeting. Hotel Gunter, San Antonio, Tex. May 5-8.
- New England Conference on Tomorrow's Children—Second. Littauer Center, Harvard University, Cambridge, Mass. July 16-18.
- New Mexico Public Health Association. Gallup, N. M. October.
- New York State Association of Public Health Laboratories—25th Annual Meeting. School of Medicine, Syracuse University, Syracuse, N. Y. May 19.
- New York State Association of School Physicians at Grand Union Hotel, Saratoga Hotel, Saratoga Springs, N. Y. June 23.
- Ohio Federation of Public Health Officials. Columbus, Ohio. May 23.
- Pacific Heating and Air Conditioning Exposition. Exposition Auditorium, Civic Center. San Francisco, Calif. June 16-20.
- Pennsylvania Public Health Association. Wilkes-Barre, Pa. May 2.
- Smoke Prevention Association of America. 11-12th Annual Convention. Ancker Hotel, New York City. June 1-6.
- Special Libraries Association. Hartford, Conn. June 16-19.
- State Charities Aid Association—State and Local Committees on Tuberculosis and Public Health. Hotel Commodore, New York, N. Y. May 20-21.
- Tennessee Public Health Association. Nashville, Tenn. May 19-21.
- Western Branch, American Public Health Association—12th Annual Meeting. San Diego, Calif. May 25-29.

### Canada

- Canadian Federation of Mayors and Municipalities. Ottawa, Ont. June.
- Canadian Public Health Association—30th Annual Meeting. Chateau Frontenac, Quebec, Que. June 9-11.

### Foreign

- International College of Surgeons. Mexico City, Mexico. August 10-13.
- Pan American Medical Association—8th Congress. Buenos Aires, Argentina. 1941.
- Second Inter-American Congress of Municipalities. Santiago, Chile. September 15-21.

## FREE TECHNICAL BULLETINS

*Available on Request  
Order by Number*

- No. 85. Fundamentals in Efficient Cleaning
- No. 107. Corrosive Action of Sterilizers and Washing Powders
- No. 125. The Control and Prevention of Ropy Milk
- No. 135. The Control of Pin Point Bacteria
- No. 145. The Germicidal Action of Bottle Washing Solutions
- No. 256. Getting the Most Out of Your Bottle Washer
- No. 258. High Bacterial Counts—Causes and Remedies
- No. 308. Milkstone Control
- No. 309. Testing of Bottle Washing Solutions

Write THE DIVERSEY CORPORATION

53 W. Jackson Blvd., Chicago, Ill.

# POLLEN ANTIGENS *for* HAY FEVER

NATIONAL POLLEN ANTIGENS are standardized, thus affording dependable potency and facilitating minimum bulk doses measured according to the need of the individual patient.

Treatment consists of preseasonal subcutaneous injections before symptoms occur and during the usual period of maximum hay fever syndrome.

## POISON IVY

RHUS TOX ANTIGEN for poison ivy, Rhus Venenata Antigen for poison oak are aqueous-alcoholic extracts, free from oil, quickly absorbed, not likely to cause tumefaction, and will retain their potency for years.

*Literature upon request*

  
**THE NATIONAL DRUG COMPANY**  
**PHILADELPHIA, U.S.A.**



# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

June, 1941

Number 6

---

---

## CONTENTS

PAGE

- Rapid Treatment of Early Syphilis with Multiple Injections of Mapharsen . . . 545  
*Evan W. Thomas, M.D., and Gertrude Wexler, M.D.*
- A Study of Standard Methods for the Detection of Coliform Organisms in  
Raw and Treated Waters . . . . . 557  
*Earle K. Borman, Elizabeth D. Robinton, and C. A. Stuart, Ph.D.*
- A Five Year Follow-up of Discharges from Maryland Tuberculosis  
Sanatoria . . . . . 568  
*Ross L. Gauld, M.B., Dr.P.H., C. H. Halliday, M.D.,  
Victor F. Cullen, M.D., and W. Thurber Fales, Sc.D.*
- Relationship of Public Health Activities to the Real Need . . . . . 577  
*W. D. Burkhalter, M.D., M.P.H.*
- Where Is Dentistry Going in Public Health? . . . . . 583  
*Nathan Sinai, D.P.H.*
- Public Health and the Law . . . . . 587  
*James A. Tobey, Dr.P.H., LL.D.*

*Continued on page vi*

---

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear. These are not to be regarded as expressing the views of the American Public Health Association unless formally adopted by vote of the Association.

---

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Reader's Guide in your Library.

---

Published by the American Public Health Association at 374 Broadway, Albany, N. Y.  
Executive Office, 1790 Broadway at 58th St., New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States, Cuba and Mexico, South and Central America; \$5.50 for Canada; and \$6.00 for other countries. Single copies 50 cents postpaid. Copyright, 1941, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor, H. S. Mustard, M.D., 600 W. 168th Street, New York, N. Y.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 1790 Broadway at 58th St., New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.



**Useful facts  
developed by  
J&J field and  
laboratory men**

● For years Johnson & Johnson Filter Service Men have spent most of their time in the field, studying farm filtration problems. Our laboratory staff has also worked extensively on farms and at milk plants. This has enabled us not only to produce Rapid-Flo Disks that are unexcelled for fast, efficient filtration, but to make available to dairymen much useful information on milk filtration and better sediment standards.

**A SIZE AND TYPE  
FOR EVERY STRAINER**

**RAPID-FLO  
FILTER DISKS**

**Johnson & Johnson**  
NEW BRUNSWICK, N. J. CHICAGO, ILL.

<i>Contents—Continued</i>	PAGE
An Institutional Outbreak of Poliomyelitis . . . . .	593
<i>A. Clement Silverman, M.D.</i>	
Epidemiological Investigation of Rural Typhoid with the Aid of the Vi Agglutination Test . . . . .	599
<i>Calista P. Eliot, Sc.D., and W. Ross Cameron, M.D.</i>	
The Ohio River Pollution Survey in Relation to Pollution Problems in the Lower Ohio River Basin . . . . .	605
<i>E. S. Tisdale</i>	
The Epidemiology of Rheumatic Fever . . . . .	611
<i>John R. Paul, M.D.</i>	
Study of Dust Conditions in the Tri-State Mining District of Oklahoma, Kansas, and Missouri . . . . .	619
<i>Charles C. Dills</i>	
<i>Discussion—H. J. Darcey</i>	
EDITORIALS:	
We Have Come a Long Way in Nutrition . . . . .	630
Delayed Birth Registration . . . . .	631
Credit Lines: A Selective Digest of Diversified Health Interests— <i>D. B. Armstrong, M.D., and John Lentz, M.S.</i> . . . . .	634
Credit—Where Credit Is Due. Information Please. Are You Listening? The Spoken Word. Re: The National Health Library. New Publications. New Trends in School Health Work. Britain Delivers the Goods. Magazine Articles. Noted and Quoted. Au Revoir or Farewell?	

*Continued on page viii*

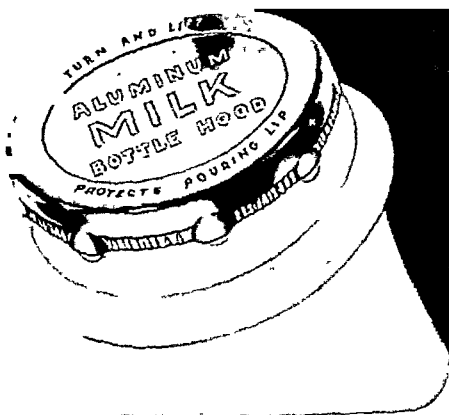
*Reprint prices furnished upon request*

# WHAT'S THE STORY BEHIND THE HOOD?

Type A Alseco Aluminum Hood on Econopour Finish bottle is both a secure seal and sanitary cover. Paper disc may be used if desired.



Type E Alseco Aluminum Hood may be used alone as both a seal and a cover, or may be used over a paper disc.



## DEFENSE COMES FIRST

*The urgent requirements of National Defense have limited the amount of Aluminum available to us for milk hoods. However, Aluminum production capacity is being rapidly expanded. When the emergency is past, there will be more Aluminum available for hoods than ever before.*

When a dairy asks whether a certain hood or cover cap will be satisfactory to adopt, you need a lot of facts. You can't tell just by looking at it.

You must know, not guess at, the adequacy of protection, behavior in cold weather, ability to withstand icing. You want the truth, not half-truths, about performance of the hood in other cities. And you want to know all about the method of application, how grades and dates are indicated, and the hood is removed.

You can easily get all these facts about Alseco Aluminum Hoods. They have been used by dairies for more than 10 years and there are hundreds of cities to which you can turn for any information you want. Beyond that, there is a great deal of laboratory test data which you can study.

Get the complete story behind Alseco Aluminum Hoods. A representative will gladly furnish data about the various styles, method of manufacture, and application in the dairy. Also he will give you a list of cities and dairies who use these sanitary closures so you can check with them to learn what actual experience has shown.

Write Aluminum Seal Company, 1359 Third Avenue, New Kensington, Penna.

Trade Mark Reg.



U. S. Pat. Off

*Alseco*  
**ALUMINUM HOODS**

*Contents—Continued*

	PAGE
Books and Reports . . . . .	641
I Remember. Sewage Treatment Works: Administration and operation. Pyschiatric Social Work. The Association's Work During 1939-40 (Canadian Public Health Association). The Romance of Medicine in Canada. Diagnostic Procedures and Reagents—1st ed. Sewage Treatment. Mental Health in the Classroom—13th Year Book, National Education Association. Wolf Child and Human Child. Plumbing and Public Health.	
Books Received . . . . .	647
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . .	648
Association News . . . . .	651
The 70th Annual Meeting. L. Van D. Chandler, Chairman, Publicity Committee. The New Jersey Committee. The Scientific Program. Hotel Rates. Application for Hotel Accommodations. Railroad Fares. Applicants for Membership.	
Employment Service . . . . .	659
News from the Field . . . . .	662
Conferences and Dates . . . . .	XIX

## INDEX TO ADVERTISERS

	Page	Page
A. P. H. A. . . . .	X	Perr
Back Service . . . . .	XII, XV, XX, XXII	IX
Membership Application Forms . . .	XVI, XX	XXIII
Affiliated Societies and A. P. H. A. Branches . . .	XVI	XXIII
Aluminum Seal Company . . . . .	VII	XXIII
American Can Company . . . . .	XXVII	
American Meat Institute . . . . .	XIII	XXI
Canadian Public Health Association . . .	XVII	II
Central Glass Works . . . . .	XI	V
Difco Laboratories, Inc. . . . .	Back Cover	III
Division of Health at Atlantic City . .	XXIV, XXV	
Division of Health at Atlantic City . .	XXVI	
Dixie-Vortex Company . . . . .		XXI
Eimer and Amend . . . . .		XI
Fisher Scientific Company . . . . .		XIV
Florida Citrus Commission . . . . .		XXVI
General Laboratories Division, Pennsylvania Salt Manufacturing Company . .		XXVIII
Gilliland Laboratories, Inc., The . . . . .		
Johnson & Johnson . . . . .		
National Drug Company, The . . . . .		
National Organization for Public Health Nursing (N.O.P.H.N.) . . . . .		
Pyrex Brand Laboratory Ware . . . . .		
Sewage Works Journal . . . . .		
Trained Nurse, The . . . . .		
Wallace & Tiernan Co., Inc. . . . .		

# American Journal of Public Health

## and THE NATION'S HEALTH

---

Volume 31

June, 1941

Number 6

## Rapid Treatment of Early Syphilis With Multiple Injections of Mapharsen

Preliminary Report of 275 Cases Treated with Mapharsen Alone  
and 141 Cases Treated with Mapharsen and Fever \*

EVAN W. THOMAS, M.D., AND GERTRUDE WEXLER, M.D.

*Department of Dermatology and Syphilology, New York University College of  
Medicine, and the Department of Dermatology and Syphilology, Third  
Medical Division (New York University), Bellevue Hospital,  
New York, N. Y.*

MANY attempts have been made to use massive arsenotherapy for the rapid cure of syphilis. Until recently these were all abortive because of the toxic effects of the drugs. Even with the aid of the continuous intravenous drip, devised by Hyman, Chargin, and Leifer<sup>1</sup> in 1933, neoarsphenamine was toxic, peripheral neuritis being one of the most frequent complications. Recently, however, these same investigators in association with a committee, appointed by Commissioner John L. Rice of the New York City Department of Health, found that arsenoxide or mapharsen given in massive dosage by the drip method caused appreciably fewer toxic effects than neoarsphenamine.<sup>2</sup>

The use of mapharsen has theoretical advantages for massive dosage which are not shared by other trivalent arsenical drugs: (1) As arsenoxide is the effec-

tive spirochetocidal derivative of all the arsphenamines, its direct use requires smaller amounts of arsenic for effective dosage. (2) A higher percentage of the arsenic can be recovered in the excreta after mapharsen is used than after neoarsphenamine.<sup>3</sup> (3) The elimination of arsenic is more rapid with mapharsen than with either arsphenamine or neoarsphenamine.<sup>3</sup> (4) As mapharsen is less sensitizing than other arsphenamines, exfoliative dermatitis is almost never encountered with its use.<sup>4</sup>

In 1937, in the wards of Bellevue Hospital we began to increase the number of mapharsen injections in patients with early syphilis from 1 a week to 2. By 1938 we were giving 3 injections a week of 0.06 gm. mapharsen for 4 weeks to all patients with early infectious syphilis. This was followed by the usual routine treatment with courses of weekly injections of bismuth alternating with courses of arsenical drugs. In the light of this experience and after observing the use of mapharsen by the

---

\* Aided in part by a grant from the American Committee on Research in Syphilis.

not given on the same days with mapharsen. In addition, the total dosage of mapharsen has been increased from 0.54 gm. to 0.84 gm. or more in selected cases. The program calls for 8 days of treatment which is given as follows:

2 injections of 0.07 gm. mapharsen on the 1st day.

Fever induced by typhoid vaccines on the 2nd day.

2 injections of 0.07 gm. on the 3rd day

Fever induced by typhoid vaccine on the 4th day.

4 days of 0.07 gm. mapharsen twice daily.

Although only a few cases have been treated in this way to date, there seems to be less discomfort than with the previous method. Obviously there are many possible combinations of fever and arsenotherapy. Our aim is to find the one which gives a minimum of discomfort and a maximum of safety with, of course, satisfactory therapeutic results.

Because we occasionally encounter patients in whom fever seems to be contraindicated, as in pregnant women or active pulmonary tuberculosis, we have not entirely abandoned intensive treatment with mapharsen alone.

#### ANALYSIS OF CASES TREATED

Reference to Tables 1 and 2 will show that the series of cases treated in no sense represents a selected group. At times we feared that we were using too little caution in this respect, but no patient was treated against his or her wishes and every precaution was taken to interrupt or stop therapy when this seemed indicated. The majority came from the poorest groups in New York City; many had varying degrees of malnutrition and mild anemias; associated diseases of an acute or chronic nature were not uncommon as is shown in Table 2. We experienced surprisingly little difficulty, however, in treating these patients. Very few of those who might have been considered poor risks when admitted to the wards had un-

TABLE 2

#### *Diseases Associated with Syphilis in the Cases Treated*

	No. of Cases
Gonorrhea .....	44
Chancroid .....	17
Lymphogranuloma inguinale .....	6
Granuloma inguinale .....	4
Balanitis .....	2
Condyloma acuminatum .....	5
Pulmonary tuberculosis .....	5
Essential hypertension .....	1
Rheumatic heart disease (inactive) .....	2
Chronic bronchitis & emphysema .....	1
Appendicitis .....	2
Appendectomy before treatment .....	1
Appendectomy interrupting treatment .....	1
Chronic alcoholism (severe) .....	8
Epilepsy .....	1
Anal fistula .....	3
Alveolar abscess (severe) .....	1
Acute sinusitis (severe) .....	1
Infected pilonidal cyst .....	1
Adenoma of thyroid .....	1
Previous thyroidectomy .....	1
Schizophrenia .....	1
Pregnancy .....	6

favorable reactions, and many of them stated that they felt better after treatment than for a long time before treatment. Six pregnant women who presented themselves with early infectious syphilis were included in our series. In no case was fever attempted in these patients. Three have been delivered since their treatment was completed. Detailed reports of results will be made later.

TABLE 3

#### *Distribution of Treatment Courses by Stage of Disease*

Total No. of treatment courses .....	416
Primary and secondary syphilis .....	380
Early latent syphilis .....	17
Retreatments * .....	19

\* These consist of cases originally treated by the rapid syringe method for early infectious syphilis. Eighteen were retreated because of relapses or reinfections and 1 because of a persistently positive Wassermann test over a period of 9 months.

TABLE 4

#### *Distribution of Cases by Type of Treatment*

Total No. of Treatment Courses from Dec. 1939 to Mar. 15, 1941 .....	416
Treated with mapharsen only .....	275
Treated with mapharsen and typhoid vaccine .....	140
Treated with mapharsen and artificial fever .....	1

TABLE 5

*Comparison of Toxic Effects in Cases Treated with Mapharsen Only—Syringe Method (Bellevue Hospital) and Intravenous Drip Method (Mt. Sinai Hospital) <sup>2</sup>*

	Syringe Method (Bellevue)		Intravenous Drip Method (Mt. Sinai)	
	No.	Per cent	No.	Per cent
Total treatment courses .....	275	100.0	288	100.0
Herxheimer or primary fevers .....	88	32.0	116	40.0
Secondary rises in temperatures .....	27	9.8	36	12.0
Slight temperature elevation throughout treatment.....	5	1.8	*	*
Exfoliative dermatitis .....	0	0.0	0	0.0
Early acute arsenical erythemas and urticarias .....	19	6.9	33	11.0
Pruritis (few hours duration) .....	15	5.5	*	*
Nitritoid (after 10th mapharsen in one patient) .....	1	0.36	0	0.0
Marked vomiting .....	18	6.5	*	*
Diarrhea (mild) .....	7	2.5	*	*
Headaches (mild) .....	56	20.4	*	*
Icteric index elevation during treatment (transient) .....	3	1.08	*	*
Jaundice during hospitalization .....	0	0.0	2	0.7
Toxic hepatitis (etiology uncertain), 6 months after treatment .....	1	0.36	1	0.34
Blood N.P.N. elevation during treatment .....	0	0.0	*	*
Blood dyscrasias .....	0	0.0	0	0.0
Peripheral neuritis within few weeks after treatment (no objective signs)...	2	0.72	5	1.6
Cerebral symptoms (total) .....	3	1.08	3	1.04
Hemorrhagic encephalitis .....	2	0.72	1	0.34
Single convulsion .....	0	0.0	1	0.34
Disorientation .....	0	0.0	1	0.34
Epileptiform convulsive seizures .....	1	0.36	*	*
Treatment interrupted due to secondary rise in temperature or marked vomiting .....	20	7.3	*	*
Treatment stopped between 0.6 and 1.0 gms. mapharsen .....	8	2.9	*	*
Due to secondary rise in fever .....	3	1.08	*	*
Due to secondary rise in fever associated with marked vomiting .....	4	1.5	*	*
Due to tachycardia in a patient with suspected hyperthyroid disease ....	1	0.36	*	*
Fatality (due to hemorrhagic encephalitis) .....	1	0.36	0	0.0

\* No information given.<sup>2</sup>

#### TOXIC MANIFESTATIONS

From Table 5 it will be seen that the toxic effects in the patients receiving only mapharsen roughly parallel those in the series treated by the intravenous drip method at Mt. Sinai Hospital. Apart from hemorrhagic encephalitis none of these manifestations warrants abandoning further experimentation with this type of treatment. After the first 2 days of injections patients were allowed out of bed and no attempt was made to alter the regular ward diet.

Table 6 gives the toxic effects noted in the series receiving combined mapharsen and fever treatment. Among this group are found the only patients who showed transitory evidence of possible renal damage. Three had elevated non-protein nitrogen associated with marked albuminuria and cylindruria. In every case these abnormal findings dis-

appeared entirely within a few days after treatment was finished. Four patients became mildly delirious at the height of their fevers but they had temperatures of over 106° F. at the time. Electrocardiographic tracings were made in a number of patients at various intervals during treatment. Those patients receiving only mapharsen showed no changes in their electrocardiograms. In the series where mapharsen was combined with fever transitory electrocardiographic changes were not infrequent. Four patients in the typhoid vaccine series had daily electrocardiograms before, during, and after treatment. Two showed T wave changes in leads I and II on the days when they had fever. This was to be expected as it is well known that fever treatments may cause transient electrocardiographic changes.

Mention must also be made of the



TABLE 6

*Toxic Effects in Series Treated with Mapharsen and Typhoid Vaccines*

	Number	Per cent
Total treatment courses .....	140	100.0
Herxheimer or primary fevers .....	53	37.8
Secondary rises in temperature .....	6	4.3
Exfoliative dermatitis .....	0	0.0
Early acute arsenical erythemas & urticarias .....	11	7.8
Severe headaches .....	123	88.0
Delirium or confusion (temperature over 106° F.) .....	4	2.9
Marked vomiting .....	97	69.0
Diarrhea .....	6	4.3
Icteric index elevation during treatment (transient) .....	7	5.0
Jaundice (total no.) .....	2	1.4
during hospitalization .....	1	0.71
3 weeks after treatment .....	1	0.71
Blood NPN elevation during hospitalization (transient) .....	3	2.14
Blood dyscrasias .....	0	0
Peripheral neuritis .....	0	0
Generalized aches and pains .....	49	35.0
Palpitation or precordial distress .....	6	4.3
Persistence of temperature over 12 hours .....	7	5.0
Treatment interrupted (total no.) .....	7	5.0
due to secondary rise in temperature .....	2	1.4
due to persistent fever after typhoid vaccine .....	3	2.14
due to acute appendicitis .....	1	0.71
due to infected pilonidal cyst .....	1	0.71
Less than 4 fevers given (total no.) .....	19	13.6
due to reactions—mainly vomiting and headaches .....	18	12.9
due to pulmonary tuberculosis .....	1	0.71
Hemorrhagic encephalitis .....	0	0.0
Fatalities .....	0	0.0

incidence of mild transitory liver damage in the series receiving typhoid vaccines intravenously. Seven had increased icteric indices and 22 per cent showed an increase of urobilinogen at some time during treatment. None of the abnormalities noted, however, remained more than a few days after treatment ended. Clinical jaundice of a few days' duration occurred in 2 patients but enlargement of the liver was not found during or after treatment in any case.

In summary, it is evident that the combination of intravenous typhoid vaccine and mapharsen, especially when both are administered the same day, gives more frequent transitory toxic effects than mapharsen alone, but no clinical evidences of hemorrhagic encephalitis were noted in 141 cases. By reducing the number of fevers and omitting mapharsen on the days when fever is given, we believe that the incidence of minor toxic effects can be materially reduced.

## LABORATORY STUDIES

Space prevents a detailed discussion of the laboratory findings in this large series. Over 100 cases had complete hematological studies immediately before and during, or right after treatment. These included cell volume and hemoglobin determinations, red and white cell counts with careful differential, platelet and reticulocyte counts, cell fragility tests, bleeding and coagulation time, quantitative bilirubin determinations and erythrocyte sedimentation rates. The studies were made by Drs. Leonard Goldwater and David H. Goldstein, New York University College of Medicine, with the aid of a trained technician, and will be reported by them in a later paper. It is of special interest that in the hemorrhagic encephalitis cases, apart from spinal fluid findings, all laboratory tests, including blood vitamin C determinations, were negative.

*Arsenic Content in the Blood:* Blood arsenic determinations were made twice a day on over 30 patients. In a few

instances these were checked in two different laboratories by two different technicians. In general, the arsenic levels in the blood gradually rose during treatment, and the curves are similar to those obtained at Mt. Sinai Hospital, where the intravenous drip was used. Complete reports of these studies will be made later by Drs. Goldwater and Goldstein.

*Spinal Fluid Findings:* The results of spinal fluid tests done immediately before and after treatment are given in Tables 7 and 8. They merit study and

ment, which is contrary to the findings in hemorrhagic encephalitis. (3) In no case was the Wassermann reaction positive after treatment. Presumably we are, therefore, dealing with treatment reactions rather than syphilis. Three of these cases received typhoid vaccines and mapharsen. One woman who received 0.66 gm. mapharsen without fever was kept in the hospital for 9 weeks following treatment in order to check her spinal fluid at intervals, but she still had increased cells and protein on discharge. Her blood serology is now

TABLE 7  
*Positive Spinal Fluids before Treatment \**

Stage of Disease	No. of Fluids Examined		Positive ** and Doubtful ***							
			Total		Positive		Doubtful		Negative	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
	Seronegative Primary Syphilis	12	100	0	0.0	0	0.0	0	0.0	12
Seropositive Primary Syphilis	42	100	5	11.9	3	7.1	2	4.8	37	88.1
Secondary Syphilis	213	100	48	22.5	36	16.9	12	5.6	165	77.5
Total	267	100	53	19.8	39	14.6	14	5.2	214	80.2

\* Of the 53 positive and doubtfully positive spinal fluids, 50 were examined immediately after treatment. The changes after treatment were not significant except for the one case shown in Table 8.

\*\* Positive spinal fluids include those with more than 15/3 cells, usually accompanied by elevations of total protein and colloidal gold changes. Of the 39 positive spinal fluids, 16 or 41 per cent had positive spinal fluid Wassermann reactions.

\*\*\* Doubtful spinal fluids include those with 12/3 to 15/3 cells accompanied by slight elevations of total protein and slight colloidal gold changes.

discussion but space permits only a few comments. It will be noted (Table 8) that, in addition to the hemorrhagic encephalitis cases, 4 patients had marked abnormalities in their spinal fluids following treatment, although 3 of them had normal findings prior to treatment. One patient had a positive Wassermann test in the higher amounts of spinal fluid before therapy but the Wassermann reaction became negative following treatment. The cells and protein, however, increased. It is difficult to explain the pleocytosis and increased protein in these 4 cases for a number of reasons: (1) They were associated with no clinical signs or symptoms. (2) The fluids continued to be abnormal for considerable lengths of time following treat-

ment, which is contrary to the findings in hemorrhagic encephalitis. (3) In no case was the Wassermann reaction positive after treatment. Presumably we are, therefore, dealing with treatment reactions rather than syphilis. Three of these cases received typhoid vaccines and mapharsen. One woman who received 0.66 gm. mapharsen without fever was kept in the hospital for 9 weeks following treatment in order to check her spinal fluid at intervals, but she still had increased cells and protein on discharge. Her blood serology is now

#### FOLLOW-UP OF PATIENTS

From the beginning of this experiment it was clear that we would be unable to follow a number of our patients for any length of time after treatment was completed. Our records show that 33 per cent are lost at present. Some of them had negative serological findings when last seen; 6 reported to out-of-town clinics or institutions where routine therapy was given because the blood Wassermann test was found to be positive. Patients are given letters to show physicians in charge of other clinics but they either lose the letters or the information is disregarded.

TABLE 8  
Changes after Treatment in Initially Negative Spinal Fluids

	No.	Per cent
Total number examined before and after treatment *	183	100.0
Definite but slight changes after treatment	37	20.2
Marked changes after treatment	6	3.3
No change after treatment	140	76.5

Details of Findings in Seven \*\* Cases showing marked changes:

Case	Time of Examination	Wass.	Cells***	Pandy	Total Protein****	Colloidal Gold
Hemorrhagic enceph.—0.9 gm. maph.	Onset of hemorrhagic encephalitis	4+4+4+	6/3	4+	over 200	1233454321
Hemorrhagic enceph.—0.99 gm. maph.	Before treatment	neg.	0	neg.	14	0000000000
	5 hrs. before onset of hemorrhagic enceph.	neg.	168/3	4+	100	0123211000
	2 days later	QNS	many RBC*****	4+	55	QNS
	17 days later	neg.	30/3	1+	26	QNS
	5 months later	neg.	0	neg.	5	0000000000
Epileptiform seizures—0.77 gm. maph.	Before treatment	neg.	6/3	neg.	10	0000000000
	Onset of seizures	neg.	8/3	trace	22	0000000000
	5 days later	4+ neg. neg.	60/3	2+	43	0011221000
	9 days later	neg.	64/3	trace	27	0000000000
	2½ months later	neg.	1/3	neg.	5	0000000000
No cerebral manifestations 0.66 gm. maph.	Before treatment	neg.	6/3	neg.	11	0001112100
	16 days after treatment	neg.	390/3	4+	80	1123432100
	23 days after treatment	neg.	180/3	4+	45	1233221000
	7 weeks after treatment	neg.	90/3	4+	45	1221000000
	9 weeks after treatment	neg.	75/3	4+	QNS	1221000000
No cerebral manifestations 0.54 gm. maph. & 4 typhoid vacc.	Before treatment	neg.	1/3	neg.	16	0000000000
	2 days after treatment	neg.	450/3	2+	38	0012110000
	18 days after treatment	neg.	120/3	1+	40	0000000000
No cerebral manifestations 0.46 gm. maph. & 2 typhoid vacc.	Before treatment	neg.	2/3	neg.	8	0000000000
	8 days after treatment	neg.	41/3	4+	60	1233321100
	17 days after treatment	neg.	53/3	2+	33	0011100000
	24 days after treatment	neg.	25/3	neg.	24	0011000000
No cerebral manifestations 0.54 gm. maph. & 4 typhoid vacc.	Before treatment	4+ + neg.	many RBC*****	neg.	18	0000000000
	1 day after treatment	4+ ± neg.	many RBC***** and WBC	±	21	0112210000
	4 days after treatment	+ ± neg.	150/3	2+	75	0112210000
	11 days after treatment	neg.	62/3	±	22	0111100000

\* Of the 267 cases shown in Table 7, 233 had spinal fluid examinations before and after treatment. Of these 233 cases, 183 had initially negative spinal fluids.

\*\* Because of similar findings to the other 6 cases, an initially positive spinal fluid is included in this table.

\*\*\* With the Fuchs-Rosenthal chamber, the total number of cells in 3 cu. mm. are counted; consequently, to express this result in the conventional fashion of cells per cu. mm., it is necessary to divide the result by 3. For example, if the chamber count were 6 cells, this would be equivalent to 6/3 or 2 cells per cu. mm.

\*\*\*\* Total proteins are determined by the method of Exton and Rose using the "junior scopometer." The normal limit of total proteins by this method is approximately 20 mg. per 100 cc.

\*\*\*\*\* Spinal fluids were clear, but microscopic examination showed many R.B.C.

Some of the missing patients may still be found as we have assurance of more help to trace them in the future.

The question naturally arose whether patients should receive the rapid treatment when it was obvious that they would not report for follow-up observation. We decided that from a public health standpoint it was better to treat

them intensively than to turn them loose after a few injections of arsenical drugs. Past experience indicated that, if we could not follow them after discharge, most of them would not continue routine therapy.

RESULTS OF TREATMENT

Because the combined treatment with

TABLE 9

*Status of 142 Cases, 6 to 15 Months after Treatment with 1.08 gm. to 1.2 gm. Mapharsen*

<i>Status before Treatment</i>	<i>No. Treated</i>	<i>Status 6 to 15 Months after Treatment</i>				<i>Lost</i>
		<i>Now Seronegative</i>	<i>Almost Seronegative *</i>	<i>Still Seropositive</i>	<i>Relapse or Reinfection</i>	
Seronegative primary syphilis	6	1	0	0	1	4
Seropositive primary syphilis	28	17	2	0	2	7
Secondary syphilis	108	55	7	3	7	36
<b>Total</b>	<b>142</b>	<b>73</b>	<b>9</b>	<b>3</b>	<b>10</b>	<b>47</b>

*Summary*

	<i>Number</i>	<i>Per cent</i>
Cases treated	142	100.0
Lost	47	33.1
Followed	95	66.9
<i>Status of 95 cases followed</i>		
Probable favorable results	82	86.3
Now seronegative (73 cases or 76.8%)		
Almost seronegative (9 cases or 9.5%)		
Still seropositive	3	3.2
Relapse or reinfection	10	10.5
<b>Total</b>	<b>95</b>	<b>100.0</b>

\* Cases listed as almost seronegative have Wassermann titers of less than 10 and the Bellevue Hospital Wassermann test is entirely negative in all but 2 cases.

fever and mapharsen was started less than 6 months ago, the results of treatment are reported only on those patients who received massive dosage with mapharsen alone. They are reported in Tables 9, 10, and 11. Early latent cases are omitted.

*Favorable Results:* Of the patients followed for 6 months or more 86.5 per cent now have a negative or almost

negative serology. This percentage includes 4 cases successfully re-treated because of relapses or reinfections after their original intensive treatment. Through the courtesy of Dr. Wadsworth of the New York State Health Department, Wassermann tests are titered in the State Laboratory to the end point in the patients of this series. Some titers of over 600 have been reported. The

TABLE 10

*Status of 59 Cases, 6 to 15 Months after Treatment with 0.66 gm. to 0.84 gm. Mapharsen*

<i>Status before Treatment</i>	<i>No. Treated</i>	<i>Status 6 to 15 Months after Treatment</i>				<i>Lost</i>
		<i>Now Seronegative</i>	<i>Almost Seronegative *</i>	<i>Still Seropositive</i>	<i>Relapse or Reinfection</i>	
Seronegative primary syphilis	4	2	0	0	1	1
Seropositive primary syphilis	4	3	0	1	0	0
Secondary syphilis	51	18	7	2	5	19
<b>Total</b>	<b>59</b>	<b>23</b>	<b>7</b>	<b>3</b>	<b>6</b>	<b>20</b>

*Summary*

	<i>Number</i>	<i>Per cent</i>
Cases treated	59	100.0
Lost	20	33.9
Followed	39	66.1
<i>Status of 39 cases followed</i>	30	76.9
Probable favorable results		
Now seronegative (23 cases or 59%)		
Almost seronegative (7 cases or 11.9%)		
Still seropositive	3	7.7
Relapse or reinfection	6	15.4
<b>Total</b>	<b>39</b>	<b>100.0</b>

TABLE 11

*Summary of Cases in Tables 9 and 10  
Status of the 134 Cases Treated with 0.66 gm.  
to 1.2 gm. Mapharsen and Kept under  
Observation 6 to 15 Months*

	No.	Per cent
Probable favorable results*	112	83.6
Still seropositive	6	4.5
Relapse or reinfection	16	11.9
Total	134	100.0

\*One of the seropositive cases and 14 of the relapses or reinfections have been re-treated by the rapid syringe method. Four of them are already seronegative. Including these 4, we have a total of 116 cases, or 86.5 per cent, with probable favorable results.

cases listed as almost negative have titers of less than 10 and the Bellevue Hospital Wassermann test is entirely negative in all but 2.

It will be noted that the percentage of favorable results is higher in the series treated with over 1 gm. mapharsen. With this dosage 86.3 per cent of those originally treated have favorable results. Only 76.9 per cent of those treated with a total dosage of 0.6 gm. to 0.84 gm. have similar results. The difference in percentages is possibly more apparent than real but, in view of a somewhat similar finding in the Mt. Sinai Hospital series, it may be significant.

Spinal fluids examined from 6 to 12 months after treatment in 98 patients were completely negative. Nine of them had positive spinal fluids prior to treatment.

*Persistently Positive Serology:* Six patients are listed as having strongly positive Wassermann tests over 6 months after treatment. One has already been re-treated with fever and mapharsen. The other 5 are still pending. Four may yet become negative because their titers continue to fall. The other case is now considered a treatment failure and is being admitted to the wards for re-treatment.

*Relapses or Reinfections:* An analysis of the 16 cases would require a paper

in itself. If we were to hazard a guess, we would list 8 and possibly 10 of the 16 as possible reinfections. Two were seronegative at the time of their original treatment. One remained negative for 6 months before returning with a penile lesion of 2 weeks' duration, a maculopapular rash of 2 days' duration, and a strongly positive blood Wassermann test. The other patient remained seronegative for 3 months and then returned with a dark-field positive penile chancre. His Wassermann titer at that time was 6. It increased to 33 during his re-treatment but has since become negative. In addition to these originally seronegative cases, 4 other patients had become seronegative before new infectious lesions appeared. They all admitted frequent sexual exposures after their original treatment. As a matter of fact, 14 of the 16 patients gave histories of exposures prior to the reappearance of new lesions. In 4 instances we were able to find and examine the probable sources of reinfection. All 4 had active infectious lesions. Two patients admitted returning to the same person to whom they had been exposed before their first infection. Their serology remained positive up to the time of the appearance of new lesions. Both of their possible sources of reinfection were found by us to have secondary syphilis of long standing. From our present knowledge it is impossible to determine whether these cases represent reinfections or relapses.

Among the patients whom we regard as relapses was one who had originally

TABLE 12

*Spinal Fluid Examinations 6 to 12 Months  
after Treatment\**

	No.	Per cent
Total number examined	98	100
Positive Spinal fluids	0	0
Negative Spinal fluids	98	100

\* 2 cases in this group had positive spinal fluids before treatment.

been treated by the drip method at Mt. Sinai Hospital and returned to us in May, 1940, with primary and secondary lesions. He was re-treated by our method only to return in October with dark-field positive lesions on his penis. He was re-treated once again but is now lost. Two patients admitted no sexual exposure prior to the appearance of relapsing lesions. Another patient was reported to have relapsed in prison but he admitted exposure prior to his imprisonment. Fourteen of the 16 cases who relapsed or were reinfected have been re-treated. Four are now completely negative and the Wassermann titers of the other cases followed seem to be responding satisfactorily.

The problem of relapse and reinfection cannot be dismissed without noting that of the 380 infectious cases treated by our rapid methods to date, 23 gave a history of previous early syphilitic lesions and treatment. Three had been treated adequately in our own clinic by routine therapy and their serological findings had been negative for well over 1 year. The others were chiefly instances of inadequate therapy.

#### DISCUSSION

From our series of 275 patients treated intensively with mapharsen, it appears that this drug can be given in massive dosage with a minimum of toxic effects. Clearly the incidence of hemorrhagic encephalitis is too great for further experimentation at present with the higher dosages of mapharsen we at first used. Both at Mt. Sinai Hospital and at Bellevue Hospital the severe cases of hemorrhagic encephalitis occurred in patients who received a total of at least 0.9 gm. mapharsen, or 4.0 gm. neoarsphenamine. This suggests but does not prove that the dosage is the chief factor involved. Combined with fever, a total dosage of 0.54 gm. to 0.6 gm. mapharsen was given to 141 cases without causing any signs of hemor-

rhagic encephalitis. We are unable to determine at present whether the results of the combined therapy will be as satisfactory as those of the larger doses of mapharsen alone, but so far our experience with combined treatment is encouraging.

We have found that it requires, on an average, 4 to 6 months following treatment for the blood Wassermann test to become negative. In some instances it may require a year or more before complete serological reversal is achieved. In general the longer a patient has had syphilis, the longer it takes for the blood Wassermann test to become negative, although there are exceptions to this rule.

The incidence of positive spinal fluids in our patients, prior to treatment, is lower than that usually recorded. We found, however, that immediately following treatment, 20 per cent of the previously negative spinal fluids showed some increase in cells or protein, and in some instances the Wassermann reaction became positive in the larger amounts of fluid. We believe that this can be explained by the actual presence within the central nervous system of a syphilitic inflammatory process which is temporarily activated by treatment. Complete healing occurs, because spinal fluids examined 6 to 12 months later were negative in every case. The possibility that the spinal fluid abnormalities, noted immediately after therapy, represent toxic reactions to arsenic must be considered in view of the 4 unusual cases previously cited. In our opinion, however, these 4 belong to a separate group.

Analysis of our results proves once more that there is no panacea for early syphilis. The intensive method of treatment may not be to blame for some of the cases we listed as "treatment failures." Before our results can be compared adequately with routine therapy more time must elapse and many fac-

tors must be considered, including the failure of patients to persist with routine treatment. It is also too soon for a scientific comparison between the therapeutic results of the intravenous drip method and the methods used by us. It seems, however, that the continuous drip has no special therapeutic advantages over intensive treatment by multiple injections. Obviously, rapid methods of treatment are still in the experimental stage and much remains to be done before any of them can be accepted as reliable and safe, but our experience should encourage their further study.

## REFERENCES

1. Chargin, L., Leifer, W., and Hyman, H. T. The Application of the Intravenous Drip Method to Chemotherapy as Illustrated by Massive Doses of Arsphenamine in the Treatment of Early Syphilis. *J.A.M.A.*, 104:878 (Mar. 16), 1935.
2. Chargin, L. Toxicological Manifestations of Massive Arsenotherapy in Early Syphilis by the Continuous Intravenous Drip Method. *Arch. Dermat. & Syph.*, 42:247 (Aug.), 1940.
3. Sobotka, H., Mann, W., and Feldbau, E. Arsenic Excretion in the Urine and Concentration in the Blood. *Arch. Dermat. & Syph.*, 42:270 (Aug.), 1940.
4. Epstein, E. Cutaneous Toxicity of Mapharsen. *Am. J. Syph., Gonorr. & Ven. Dis.*, 25:225 (Mar.), 1941.
5. Dattner, Bernhard. Probleme und Ergebnisse der Paralysebehandlung. *Klin. Wchnschr.*, III, 5:177, 1923.
6. de Kruif, P., and Simpson, W. M. Possible Significance of the Inhibitory Effect of Fever on Anaphylactic Phenomena. *J. Lab. & Clin. Med.*, 26:125 (Oct.), 1940.

# A Study of Standard Methods for the Detection of Coliform Organisms in Raw and Treated Waters\*

EARLE K. BORMAN, ELIZABETH D. ROBINTON, AND  
C. A. STUART, PH.D.

*Assistant Director, and Senior Microbiologist, Bureau of Laboratories, State Department of Health, Hartford, Conn.; and Biological Laboratories, Brown University, Providence, R. I.*

THOSE responsible for the safety of public water supplies are often puzzled by laboratory results seemingly in conflict with existing conditions and not explainable by any known lapse in a treatment schedule considered adequate upon the basis of past experience. The results obtained from samples of treated water taken at points throughout a distribution system are frequently at variance with observed field data and consequently difficult to interpret. This has been especially true of certain supplies in Connecticut where water entirely free from permanent sources of pollution is readily available to many communities.

These considerations have led to the present study which is based upon results of 52 consecutive weekly laboratory studies of multiple samples of both untreated and treated waters from three Connecticut supplies selected to represent (A) a supply from a small watershed free from permanent habitations, limited in the storage capacity of its reservoir and treated by chlorination only, (B) a supply from a large water-

shed relatively sparsely populated but free from permanent sources of pollution, having a large storage capacity and treated by chlorination only, and (C) a supply derived from a very large watershed not thoroughly protectable although free from any serious permanent sources of pollution, with moderate storage but with adequate treatment including coagulation, sedimentation, filtration, chlorination, ammoniation, and treatment with activated carbon. These supplies will be referred to as A, B, and C respectively. Cross-connections are believed to have been eliminated as a factor which might affect our results since rigid inspection failed to disclose any hazards of this type. The more detailed engineering aspects of this study are presented elsewhere.<sup>2</sup>

## SAMPLING PROGRAM

Sanitary engineers of the Connecticut State Department of Health collected samples one day each week for one year from each source of supply ("untreated water"), from points immediately beyond the treatment plants ("finished water"), and from representative points on the distribution

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 11, 1940.



systems ("delivered water"). A total of 4 samples of untreated water was collected weekly from each supply, two in the morning on the sampling date and two in the afternoon. Samples of finished water from points near the chlorinators were collected with thiosulfate; samples from other points in the distribution systems were collected with thiosulfate when significant residual chlorine was detected in the field by the orthotolidine test. Samples of delivered water were collected weekly from 9 sampling points on supply A; from 13 sampling points on supply B; from 9 sampling points on supply C.

Sampling points on the distribution system were selected with regard to year-round availability, freedom from potential sources of sampling contamination, and location on mains and laterals at varying distances from the distribution sources.

#### LABORATORY METHODS

The tests for presence of coliform organisms were made in strict conformity with Standard Methods<sup>1</sup> through the completed test. However, the completed test was made on every portion of water giving a positive presumptive test and not only upon "the lactose broth tubes which show gas from the smallest amount of water tested" as permitted by Standard Methods.

The following inocula were used for samples of untreated water: Five 10 ml. portions; one each of 1.0, 0.1, 0.01 and 0.001 ml. portions. The two smallest inocula were omitted for the samples of finished and delivered water. Liquid confirmatory media were not used. All strains from positive completed tests were plated on eosin-methylene-blue agar for purity, fixed and subjected to biochemical tests as follows: Rapidity and degree of gas production from lactose broth at 37° C.; indol production; methyl red test; Voges-Proskauer test; utilization of citrate; fermentation of cellobiose. All strains not giving more than 10 per cent

gas in lactose broth after 48 hr. at 37° C. were tested for lactose-splitting power at 20° C. All strains not giving typical MR-VP reactions at 37° C. were replated for purity and retested by the above series of tests at both 20° C. and 37° C.

#### QUALITY OF UNTREATED WATERS

*Coliform Densities*—Only those observations will be presented which are necessary for an understanding of the coliform flora of each supply and for interpretation of laboratory results. In general, the coliform densities of the three supplies when expressed as most probable numbers per 100 ml. showed what appeared to be a significant correlation with run-off due to rainfall although local conditions such as size of reservoir and size of watershed appeared to be controlling factors on the rapidity of response. No consistent correlation between temperature of the untreated waters and coliform densities was noted, however.

The observed coliform density expressed as the most probable number per 100 ml. for supply A was below 10 during 50 per cent of the period covered with only 7 of 52 samplings showing more than 100 per 100 ml. The most probable number per 100 ml. rose above 1,000 on only one occasion and never rose to 10,000. Rise and fall of coliform densities were sudden and sharp when plotted on the basis of a sample each week.

Supply B had a coliform density of less than 10 per 100 ml. approximately 44 per cent of the times sampled and showed more than 100 per 100 ml. on only 7 of 52 samplings. The most probable number of coliforms exceeded 1,000 per 100 ml. on three occasions, being above 10,000 on two of these days.

The coliform density of supply C was over 100 per 100 ml. on 67 per cent of the sampling dates, never descended to 10 per 100 ml., and was, in fact, over 1,000 per 100 ml. on 8

of the 52 sampling dates. The figures occasionally were considerably greater than 1,000 but never reached the 10,000 level on any sampling date.

From the foregoing observations it might be concluded that the raw water of supply B was approximately comparable to that of supply A though of slightly poorer sanitary quality, while the untreated water of supply C was considerably inferior to both. This seems compatible with the known facts concerning the three watersheds.

*Coliform Types Found*—Study of the coliform strains isolated confirmed the conclusions drawn from the coliform densities found. It must be borne in mind that selection of strains by Standard Methods tests is in the direction of the genus *Escherichia* even though multiple types were frequently isolated from many tubes. Therefore, since no systematic effort was made to isolate all coliform strains present in a given inoculum, the results of studies of individual strains may be satisfactory as a yardstick of the relative proportions of *Escherichiae* in the raw waters, but the proportions of the other sections of the coliform group determined in this manner are of no significance. In this work, the indol, methyl red, and Voges-Proskauer tests have been used as a basis for the classification of types. Citrate utilization has not been given the weight accorded it by some authors because of the observations by Griffin and Stuart<sup>3</sup> that indol production is the more stable property and therefore more suitable for taxonomic purposes.

A summary of the results is given in Table 1. Supply A with a watershed free from permanent habitations has the lowest average coliform density and a proportion of *Escherichia* significantly below that for the other supplies. Supply B with a watershed on which there are some permanent habitations does not have a significantly higher average coliform density than supply A but does show the effect of its greater population burden in the larger percentage of presumptive tubes yielding *Escherichia*. Supply C shows a higher average coliform density and a correspondingly higher *Escherichia* density as the result of the practically unprotectable nature of the watershed.

#### QUALITY OF THE FINISHED WATERS

For the purpose of this paper it is preferable to separate the finished water (plant effluent) from delivered water (distribution system). The sampling point for finished water for supply A was located 185 ft. beyond the chlorinator on a 10 in. main at a point where samplings would be taken approximately 5 min. after chlorination; for supply B, 300 ft. beyond the chlorinator on a 36 in. main, approximately 2 min. after chlorination; for supply C, just beyond the clear well from which the water is pumped into the distribution system, approximately 2 hr. after chlorination.

Results of samplings from supply A indicated that coliforms were passing into the distribution system from time to time and were actually detected on 12 of the 52 sampling dates. Field observations (Scott<sup>2</sup>) indicated that a contributing factor was the apparent inability of the automatic device regulating chlorine dosage to provide adequate treatment at times of heavy flow. On one occasion (October 5) all samples of plant effluent showed coliform organisms in 0.1 ml. as a result of breakdown of the chlorinator.

TABLE 1

*Coliform Densities in the Untreated Waters*

Supply	No. of Presumptive Tubes Inoculated	Per cent of Positive Completed Tests	Per cent of Presumptive Tubes Showing <i>Escherichia</i>
A	1,854	33.7	15.9
B	1,854	37.7	25.6
C	1,843	61.3	41.3

Although coliforms were isolated from one of ten 10 ml. portions of finished water from supply B only on two occasions (March 15 and April 20), it is known that one serious inadequacy of treatment occurred during the interval between samplings preceding August 23. On one occasion during this time plant records show that the unit chlorine dosage had to be increased more than 50 per cent within a very brief time during an extremely heavy rainfall. Since chlorine dosage was regulated according to manually operated chlorine residual determinations, it is highly probable that the speed of adjustment of chlorine dosage was not sufficiently fast on all occasions to offset a rapid increase in chlorine demand.

Samples of the finished water of supply C yielded coliform organisms on four occasions. These results indicate that temporary inadequacies of treatment may occur even when water is as intensively treated as is this supply although the reasons are not clearly perceptible.

#### QUALITY OF DELIVERED WATERS

The probability of prior contamination of coliforms in water passing

through the treatment plant at occasional intervals during which treatment may have been inadequate must be borne in mind when evaluating results from samples taken at points in a distribution system removed from the treatment plant. Samples of this nature have been termed "delivered water" for the purposes of this paper. Our results have indicated to some extent the fate of these coliforms under different conditions in the distribution systems following their introduction.

In Figures 1, 2, and 3 the sampling points for delivered waters on supplies A, B, and C respectively are indicated by numbers. The distance of each point from the distribution source can be estimated from the scales given. Location of each point on mains or laterals of varying sizes is indicated. The sampling points for plant effluents already discussed are designated by the letter F.

In general, the results of tests on the samples of delivered water were considerably poorer than those on comparable samples of finished water taken the same day. A summary of the results of the three supplies is presented in Chart I. The coliform densities are represented by the per-

FIGURE 1—DISTRIBUTION SYSTEM, SUPPLY A.

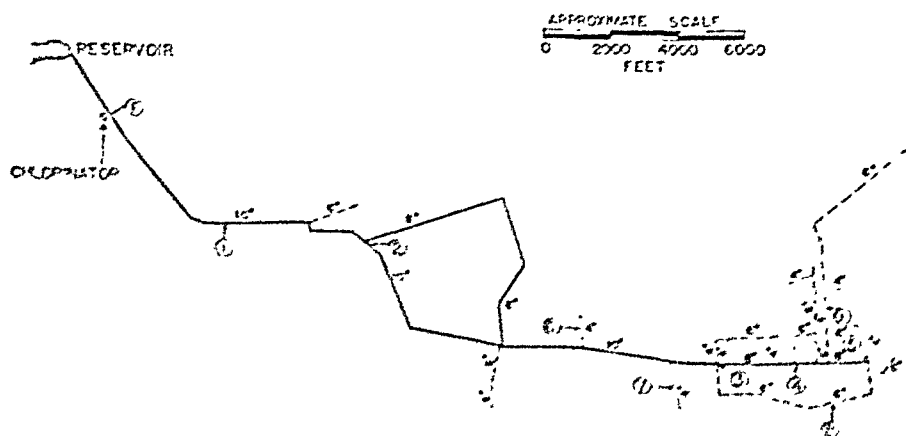
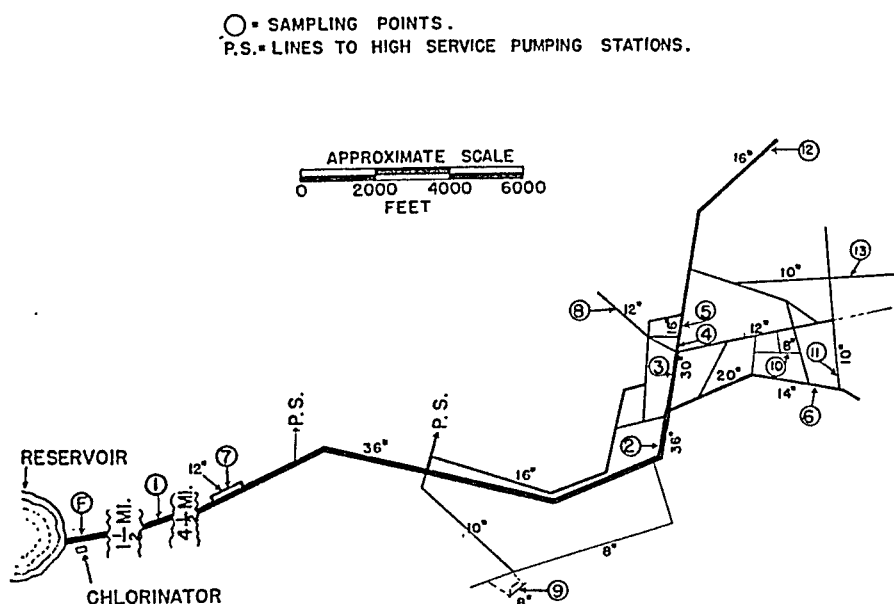


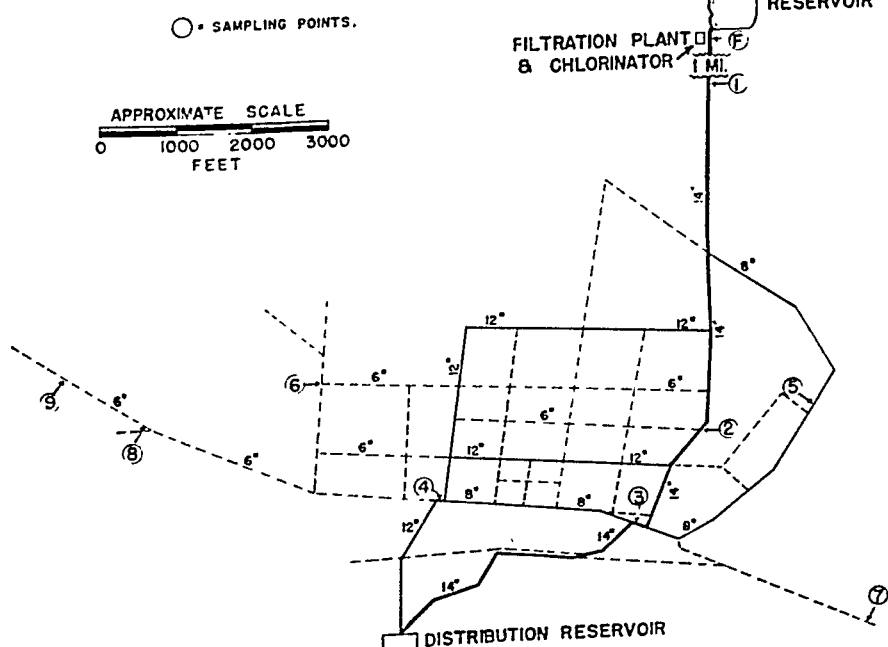
FIGURE 2—DISTRIBUTION SYSTEM, SUPPLY B.

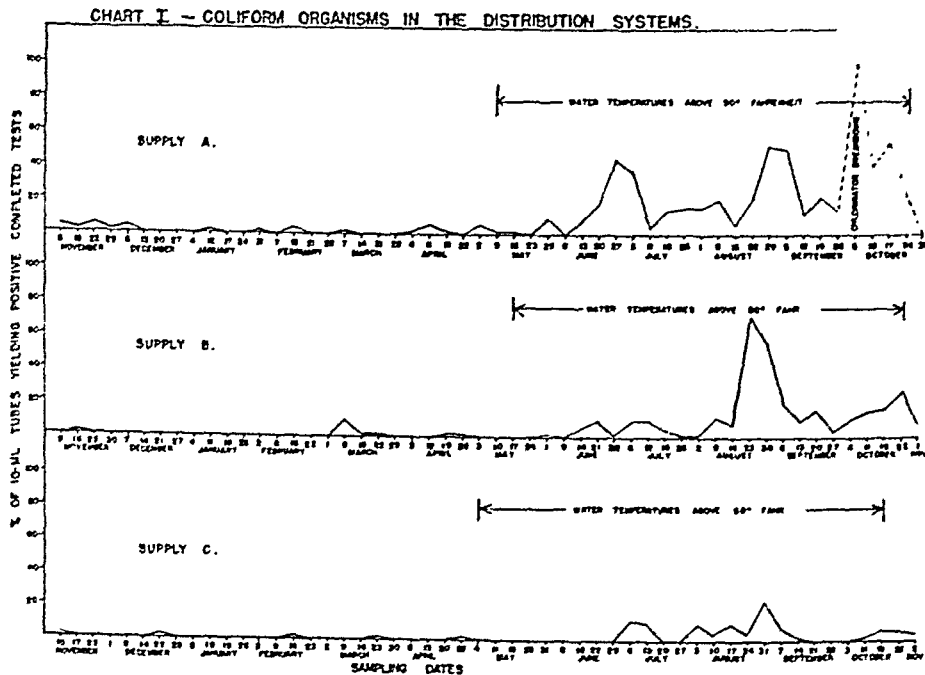


centage of the entire number of 10 ml. inocula which gave positive completed tests on each sampling date. This method of presentation permits a more concise type of graph than one based upon most probable numbers without changing the shape significantly.

It will be noted that the average coliform densities in the distribution systems of supplies A and B were significantly greater than that in supply C. Furthermore, coliforms were detected in delivered waters of supply C on 18 sampling dates; of supply B on

FIGURE 3—DISTRIBUTION SYSTEM, SUPPLY C.





28 sampling dates; of supply A on 33 sampling dates prior to breakdown of the chlorinator. This is probably due to the beneficial effect of filtration and ammoniation on supply C.

*Influence of Temporary Inadequacy of Treatment*—Two specific instances of known inadequacy of treatment have been noted (breakdown of the chlorinator on supply A and rapidly increasing chlorine demand on supply B). The distribution systems concerned continued to show coliform organisms for at least 3 weeks. These occurrences account for the October 5 peak on supply A and the August 23 peak on supply B. In both cases a progressive diminution of coliform density was found in weekly samples following the inadequacies of treatment, and the contamination persisted longest in small diameter pipes farthest removed from the distribution source.

With these facts in mind and with the knowledge that sampling of the plant effluents was a discontinuous process, it is hardly possible to dismiss the possibility of similar explanations for certain other peaks of coliform density in the delivered waters. For instance,

on supply A the results on August 29 and September 5 followed periods of greater than average rainfall during which times temporary inadequacies of treatment could have occurred. In addition, the poor results on the *finished* water samples of August 17 on supply C may have been the result of some temporary and undetected inadequacy of treatment leading to the coliform peak of August 31 in *delivered* water.

*Influence of Water Temperature*—The possibility of multiplication of coliforms within the distribution systems must not be overlooked. In fact, this possibility is suggested by the fact that the average coliform density of the distribution system of each supply was greater during the period of the year when temperatures in the system were above 50° F. as indicated in Chart I. As a matter of fact, coliforms were absent only on rare occasions during this period in delivered waters of supplies A and B.

Our results indicate that coliforms once introduced persist longest at points farthest removed from the distribution source and in laterals or feeders of small diameter pipe. Sampling points

TABLE 2

*Frequency of Positive Tests at Sampling Points on Distribution Systems*

Sampling Point	Supply A		Supply B		Supply C	
	Size of Pipe in Inches	Percentage of Times Positive	Size of Pipe in Inches	Percentage of Times Positive	Size of Pipe in Inches	Percentage of Times Positive
1	10	5.8	36	5.8	14	3.8
2	10	4.0	36	11.8	14	1.9
3	8	11.5	30	9.6	14	2.0
4	8	21.3	18	7.7	12	3.8
5	8	26.9	16	13.5	8	0.0
6	4	24.0	14	11.5	6	3.8
7	4	29.4	12	15.7	6	9.6
8	6	26.9	12	9.6	6	9.8
9	4	25.5	8	13.5	6	6.5
10			8	19.2		
11			10	23.1		
12			16	28.8		
13			10	30.8		

in these locations were responsible for the majority of positive tests on samples of delivered waters from the three supplies. This is shown in Table 2 which indicates the frequency with which each sampling point was found positive. By reference to Figures 1, 2, and 3, it will be noted that there is a tendency for coliforms to gather at points in the distribution system where there is a diminished volume of flow because of distance from the distribution source, size of pipe, or a combination of both.

Our results do not prove or disprove the hypothesis that multiplication of these persisting coliforms may take place in foci where volume of flow is low and residual chlorine negligible when temperature and other conditions are favorable. The results, however, strongly suggest that growth may take place to a limited extent under favorable conditions. In fact, there is presumptive evidence that coliforms may have spread through parts of the distribution systems from foci in small pipe remote from the distribution sources and then disappeared in reverse order simulating the rise and fall of a bacterial population. It should be emphasized that this is an impression derived from results of a weekly and therefore discontinuous sampling program, so that the data are insufficient

for the drawing of definite conclusions and there is certainly no evidence that this "pipe growth" goes on in profusion under normal conditions.

*Types Found in the Distribution Systems*—Coliform types representative of all three sections of the group were found in all three distribution systems. We are inclined to be cautious in the interpretation of these results which may be summarized as follows:

1. Each distribution system presented an individual picture.

2. Supply A yielded a proportionately large number of intermediates; supply B, of *Escherichia*; supply C, of *Aerobacter*.

3. The types isolated most consistently from each supply were citrate-positive and cellobiose-positive although others without these characteristics were isolated. The large proportion of *Escherichia* in supply B was principally due to a type with Imvic reactions  $++-$  producing acid but no gas in cellobiose (Type 15 of Stuart, Griffin and Baker<sup>4</sup>), but the typically fecal Type 19 (Imvic  $++--$ ) occurred half as frequently and both reached maximum concentration in lines of small diameter at approximately the same time.

#### OBSERVATIONS ON STANDARD METHODS

During the course of the study care-

ful records were kept of colonial appearance of colonies fished from E.M.B. and of gas formation in both presumptive and completed tests. These records are summarized and discussed below.

*Appearance of Eosin-Methylene-Blue Colonies*—"Standard Methods" contains references to "typical colonies" but does not define them. It is, however, generally accepted that the typical coliform colony on E.M.B. agar presents a metallic luster or sheen. It is further recognized that many coliform cultures yield colonies with black centers but without the sheen and that others present an evenly colored surface, frequently pink but sometimes white or even brownish red.

The color and other characteristics of any given colony may be influenced by the presence of other organisms, the number of colonies in a given area, the length and temperature of incubation, or the characteristics of the differential medium. The observations on colonial appearance made here describe the appearance of the colonies as noted on E.M.B. plates streaked routinely from presumptive tubes in strict conformity with all directions given in Standard Methods and so are probably not comparable to pure culture streakings.

During the course of the study the colonial appearance of each of 3,245 coliform strains isolated was recorded as (1) Sheen, (2) Centers, (3) Red, (4) Pink, or (5) White. No attempt

was made to record other characteristics such as size and consistency. These strains were subsequently typed with the results shown in Table 3.

An analysis of the figures given shows that 81.8 per cent of all coliforms isolated showed definite signs of lactose fermentation on E.M.B. agar as evidenced by production either of a metallic sheen or of a black center, but that only 55.4 per cent could be classified as producing colonies with a typical sheen. On the basis of groups, 92.2 per cent of the *Escherichia* strains showed evidence of lactose fermentation but only 76.3 per cent developed a sheen. Among the intermediates, 77.9 per cent showed signs of lactose fermentation and 38.6 per cent produced a sheen. In the *Aerobacter* group 69.8 per cent showed sheen or black centers but only 35.3 per cent showed the typical sheen.

During the course of the study only one sheen colony out of 1,798 failed to yield a positive completed test. The necessity for completed tests on sheen colonies seems negligible if this percentage (0.05 per cent) is a true index in all localities.

*Weak or Delayed Lactose Fermentation*—"Standard Methods" contains the following statements on page 211 with regard to the presumptive test:

"Formation within 24 hours of gas in the inverted vial in the fermentation tube constitutes a *positive presumptive test*."

"If no gas or only a small bubble of gas is formed in 24 hours, the incubation shall be continued to 48 hours."

TABLE 3  
*Classification of Coliform Colonies on Eosin-Methylene-Blue*

Type of Colony	No. of Colonies by Kind					Total
	Sheen	Centers	Pink	Red	White	All Colonies
<i>Escherichia coli</i>	1,161	242	65	4	0	1,472
<i>Shigella</i>	201	265	111	2	2	581
<i>Enterobacter</i>	414	494	243	7	6	1,172
<i>Aerobacter</i>	12	6	5	0	0	23
<b>Total</b>	<b>1,790</b>	<b>707</b>	<b>224</b>	<b>13</b>	<b>8</b>	<b>2,742</b>

Records kept of isolations in this study from tubes showing beginning gas production (less than 10 per cent) in 24 hours show that 151 strains including 37 in the *Escherichia* group would have been missed entirely if fishing had been delayed an additional 24 hours. For that reason it is suggested that the above directions be modified by inserting the words "in any amount" following the word "gas" in the first sentence and by amplifying the second statement if it is thought necessary to continue the incubation even though tubes showing bubbles of gas in 24 hours shall have been fished.

Careful records were also kept of isolations from presumptive tubes showing some gas but less than 10 per cent in 48 hours. A total of 273 strains including 56 in the *Escherichia* group were isolated from such tubes. When all these strains were isolated in pure culture, only 7 required more than 24 hours' incubation to produce gas in the completed test procedure. This suggests that slow lactose fermentation in the presumptive tests may have been due in most cases either to the inhibitory effect of other organisms or to the scarcity of coliforms in the original inoculum. The latter possibility would present conditions analogous to single-cell cultures which often go through a prolonged lag period before vigorous growth occurs. It does not seem probable that the slow or weak lactose fermentation in presumptive tests could be due to degradation of lactose-splitting power as the result of treatment and other unfavorable features of the environment, since the authors have never observed such rapid rejuvenation of cultures actually known to be degraded.

True "aberrant coliforms" in the sense of Stuart, Mickle, and Borman<sup>5</sup> were only infrequently responsible for weak fermentation of lactose in presumptive tests in this study. These

forms were seldom isolated probably because Standard Methods tends to enrich the more normal fermenters present in a water supply.

*Permissive Use of Only Smallest Gas Producing Inoculum for Completed Test*—"Standard Methods" permits in many cases an entirely false interpretation of results by allowing the examiner to confirm and complete only those lactose broth tubes producing gas from the *smallest* inoculum used. Positive presumptive tests were found in tubes inoculated from less than 10 ml. of 81 samples of treated water during this study. In only 21 of these cases (25.9 per cent) would a true picture of coliform density have been given by arbitrarily calling the larger inocula showing gas positive without actually completing the test.

In 8 instances when a positive completed test was actually obtained on the smallest gas producing inoculum, a portion or all of the larger inocula failed to give like results even though streaked at the first sign of gas production. Three of these samples showed gas production in all five 10 ml. portions but failed to give positive completed tests from 1, 2, and 3 of the latter tubes respectively. One such sample with 4 positive presumptive 10 ml. portions failed to yield a positive completed test from any of the larger inocula while another failed to do so from one of the 4 tubes. Three other samples with positive presumptive tests from 1, 2, and 3 10 ml. portions respectively failed to yield positive completed tests from one tube, the only one in one instance.

In 21 instances when the smallest inoculum gave a negative completed test all the larger inocula were also negative although some (15 samples) or all (6 samples) had given positive presumptive tests. In 31 other cases a portion of the positive presumptive tubes inoculated with the larger quan-



Records kept of isolations in this study from tubes showing beginning gas production (less than 10 per cent) in 24 hours show that 151 strains including 37 in the *Escherichia* group would have been missed entirely if fishing had been delayed an additional 24 hours. For that reason it is suggested that the above directions be modified by inserting the words "in any amount" following the word "gas" in the first sentence and by amplifying the second statement if it is thought necessary to continue the incubation even though tubes showing bubbles of gas in 24 hours shall have been fished.

Careful records were also kept of isolations from presumptive tubes showing some gas but less than 10 per cent in 48 hours. A total of 273 strains including 56 in the *Escherichia* group were isolated from such tubes. When all these strains were isolated in pure culture, only 7 required more than 24 hours' incubation to produce gas in the completed test procedure. This suggests that slow lactose fermentation in the presumptive tests may have been due in most cases either to the inhibitory effect of other organisms or to the scarcity of coliforms in the original inoculum. The latter possibility would present conditions analogous to single-cell cultures which often go through a prolonged lag period before vigorous growth occurs. It does not seem probable that the slow or weak lactose fermentation in presumptive tests could be due to degradation of lactose-splitting power as the result of treatment and other unfavorable features of the environment, since the authors have never observed such rapid rejuvenation of cultures actually known to be degraded.

True "aberrant coliforms" in the sense of Stuart, Mickle, and Borman<sup>2</sup> were only infrequently responsible for weak fermentation of lactose in presumptive tests in this study. These

forms were seldom isolated probably because Standard Methods tends to enrich the more normal fermenters present in a water supply.

*Permissive Use of Only Smallest Gas Producing Inoculum for Completed Test*—"Standard Methods" permits in many cases an entirely false interpretation of results by allowing the examiner to confirm and complete only those lactose broth tubes producing gas from the *smallest* inoculum used. Positive presumptive tests were found in tubes inoculated from less than 10 ml. of 81 samples of treated water during this study. In only 21 of these cases (25.9 per cent) would a true picture of coliform density have been given by arbitrarily calling the larger inocula showing gas positive without actually completing the test.

In 8 instances when a positive completed test was actually obtained on the smallest gas producing inoculum, a portion or all of the larger inocula failed to give like results even though streaked at the first sign of gas production. Three of these samples showed gas production in all five 10 ml. portions but failed to give positive completed tests from 1, 2, and 3 of the latter tubes respectively. One such sample with 4 positive presumptive 10 ml. portions failed to yield a positive completed test from any of the larger inocula while another failed to do so from one of the 4 tubes. Three other samples with positive presumptive tests from 1, 2, and 3 10 ml. portions respectively failed to yield positive completed tests from one tube, the only one in one instance.

In 21 instances when the smallest inoculum gave a negative completed test all the larger inocula were also negative although some (15 samples) or all (6 samples) had given positive presumptive tests. In 31 other cases a portion of the positive presumptive tubes inoculated with the larger quan-

9. The practice permitted in Standard Methods of subjecting to the completed test only the smallest portion giving a positive presumptive test frequently leads to a false impression of the sanitary quality of a treated water. All tubes showing gas should always be confirmed and completed.

10. The adoption of standards for judging the safety of a supply over a period of time should be preceded by careful consideration of sampling points and of spacing of samples. Distinction should be made between "finished" water (plant effluent) as a means of judging the adequacy of treatment at the time of sampling and "delivered" water from selected points in the distribution system as a means of detecting past inadequacies of treatment. An arbitrary standard such as the "United States Treasury Department Standard" applied indiscriminately to all samples regardless of source and intervals between samplings, may give an entirely false picture of plant operation over a given period.

**ACKNOWLEDGMENTS**—The authors wish to acknowledge the coöperation and helpful

criticism of Warren J. Scott, Director, Bureau of Sanitary Engineering, Connecticut State Department of Health, under whose direction the sampling program and collection of field data were carried out. The faithful and intelligent execution of plans by Eugene L. Lehr, Senior Sanitary Engineer, and David C. Wiggin, Assistant Sanitary Engineer, is gratefully acknowledged. Technical assistance was rendered during a part of this study by Chester S. Bowers and Elizabeth B. C. Vaill.

#### REFERENCES

1. *Standard Methods of Water Analysis*, 8th ed., American Public Health Association, New York (1936).
2. Scott, Warren J. Bacteriological and Field Studies of Water Distribution Systems. *J. New Eng. Water Works A.*, in press.
3. Griffin, A. M., and Stuart, C. A. An Ecological Study of the Coliform Bacteria. *J. Bact.*, 40, 1:83 (July), 1940.
4. Stuart, C. A., Griffin, A. M., and Baker, M. E. Relationships of Coliform Organisms. *J. Bact.*, 36, 4:391 (Oct.), 1938.
5. Stuart, C. A., Mickle, F. L., and Borman, E. K. Suggested Grouping of Slow Lactose Fermenting Coliform Organisms. *A.J.P.H.*, 30, 5:499 (May), 1940.

# A Five Year Follow-up of Discharges from Maryland Tuberculosis Sanatoria\*

ROSS L. GAULD, M.B., DR.P.H., C. H. HALLIDAY, M.D.,  
F.A.P.H.A., VICTOR F. CULLEN, M.D., AND  
W. THURBER FALES, Sc.D., F.A.P.H.A.

*School of Hygiene and Public Health, Johns Hopkins University; Bureau of  
Communicable Diseases, State Department of Health; Superintendent  
Tuberculosis Sanatoria, State Department of Health; and Bureau of  
Vital Statistics, City Department of Health, Baltimore, Md.*

THE study of the fate of persons who have received treatment for pulmonary tuberculosis in sanatoria is of considerable importance to the clinician and also to the epidemiologist. Definite knowledge of what happens following discharge from a sanatorium is necessary not only to evaluate the results of sanatorium treatment and to advance a prognosis, but such knowledge can also be of value as an index in comparing the characteristics of the disease in different areas.

Attempts to obtain exact knowledge of events subsequent to discharge by relying upon the patient's coöperation either in reporting at specified intervals or in replying to questionnaires, are prone to yield results which contain bias because of the inability of fatal cases to report and a tendency for those who have improved to coöperate more readily. Only by a systematic follow-up through personal canvas can the percentage lost from observation be lowered and bias reduced to a minimum.

In Maryland a systematic follow-up of sanatorium discharges has been conducted on a state-wide basis since January 1, 1935. This has been possible through the coöperative efforts of the Tuberculosis Sanatoria, the Maryland State Department of Health, the Baltimore City Health Department, and all of the local city and county health units throughout the state. Every year a visit is made by some member of the local health department (usually the nurse) to each person living within the area who has been discharged from any sanatorium in Maryland since January 1, 1934. These visits are so scheduled that they are made each year in the same month as that in which the discharge occurred, and are for the purpose of recording the history of the year elapsing since the last record. The information recorded at the time of the visit is quite simple and is not difficult to obtain—the date, place, and cause of

Acknowledgment is made to the technical assistance of Mrs. Margaret McConnell and Miss Janet J. King (Maryland State Department of Health).

Aided by a grant from the Works Progress Administration.

\* Read before the Epidemiology Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

all deaths; the residence of the living, at home, again in sanatorium, or out of the state; the patient's capacity to work, and the amount of time, if any, confined to bed or in the sanatorium. The data thus collected by the local health departments are forwarded for assembly to the State Department of Health, except in Baltimore City where they are assembled in the City Health Department. The analysis of the records to date has been undertaken by the Department of Epidemiology of the School of Hygiene and Public Health, Johns Hopkins University. This is the first report to be made of this investigation, and since the study is still in progress, it is essentially of a preliminary nature.

The data available for analysis at present are on all persons discharged from the various sanatoria throughout the state between January 1, 1934, and December 31, 1938—a period of 5 years. The records include the information obtained by all visits up to the close of 1939. The maximum period of observation is 5 years from the time of discharge, and the minimum period may be only a few days, as in the case of those who die or emigrate from the state soon after discharge. The state-wide nature of this investigation has the advantage that the mortality among these discharges can be readily compared with the mortality among the general population of the state. On the other hand, it has the disadvantage of being unable to follow patients after emigration from the state, and this has resulted in a loss from observation of a considerable number of persons.

Throughout the analysis, time has been counted in years from the initial discharge during the study period and not in calendar years. The status of the individuals at annual intervals, dating from the time of discharge, has been determined and will be shown

graphically for the various racial and clinical groups. The results are expressed as the number of individuals out of 1,000 discharges who are dead or living 1, 2, 3, 4, and 5 years from the time of discharge. The living are further subdivided into whether they are living at home, are again in the sanatorium, or have been lost from observation either by emigration from the state or in some other way. As the majority of the persons in the study were observed for less than the full 5 years, two assumptions were necessary to express the findings in these terms. The first is that persons observed in any one year (*i.e.*, dating from discharge, are, with respect to that year, an unselected sample of the whole. The second assumption is that persons leaving observation because of emigration or loss in some other way are unselected with respect to subsequent mortality. Inasmuch as the analysis is made by race, age, and stage of the disease, it is felt that these assumptions are not unreasonable. The biometrics of the study are rather complex and will be discussed in a later paper. They are based upon the use of the modified life-table method of analysis as developed by the late Dr. Frost and his collaborators. A discussion of the methodology involved must form the basis of a separate article.

The present analysis is confined to a consideration of the fate of persons discharged one or more times from the Tuberculosis Sanatoria of Maryland during the years 1934–1938. It is concerned with the experience of those who were treated in the sanatoria for pulmonary tuberculosis of the adult or reinfection type and is limited to adolescents and adults. No minimal cases under 15 years of age were included because of the possibility of confusion with the childhood type of pulmonary infiltration. The composition of the study group by age, color, and

TABLE 1

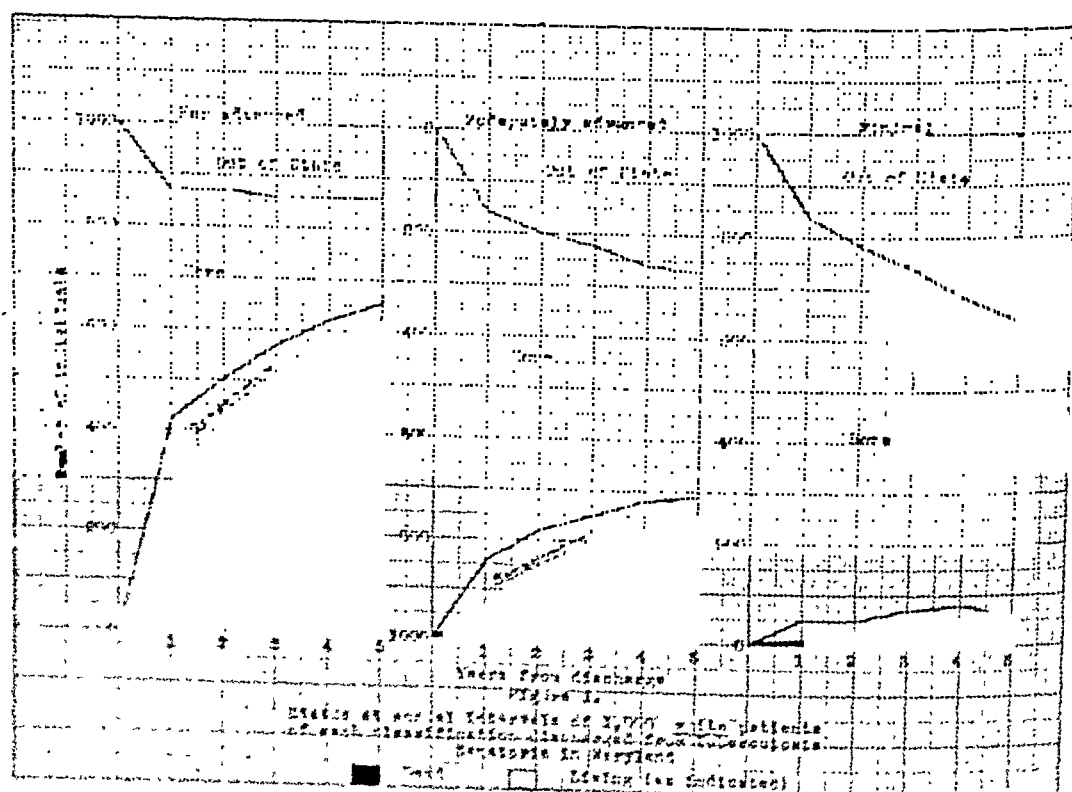
*Distribution by Race, Age at Discharge, and Clinical Classification of 4,149 Individuals with Pulmonary Tuberculosis of the Adult Type Discharged from the Tuberculosis Sanatoria of Maryland, 1934-1938*

Clinical Classification	Age at Discharge				
	Under 20	20-44	45+	Unknown	Total
White					
Far advanced	73	782	332	10	1,197
Moderately advanced	129	1,085	363	10	1,587
Minimal	154	457	104	8	723
Total					3,507
Colored					
Far advanced	62	222	37	1	322
Moderately advanced	26	91	14	..	131
Minimal	56	121	10	2	189
Total					642

classification according to the extent of the lesion at the time of admission to the sanatorium, is shown in Table 1. The clinical classification used is that of the National Tuberculosis Association.

The fate of the patients discharged from the sanatoria has been studied

according to classification on admission to the sanatorium, and their subsequent history is shown graphically in Figure I, which indicates the fate of 1,000 white discharges of each clinical class over a period of 5 years following discharge. In this graph the height of the vertical lines, spaced at yearly intervals, repre-



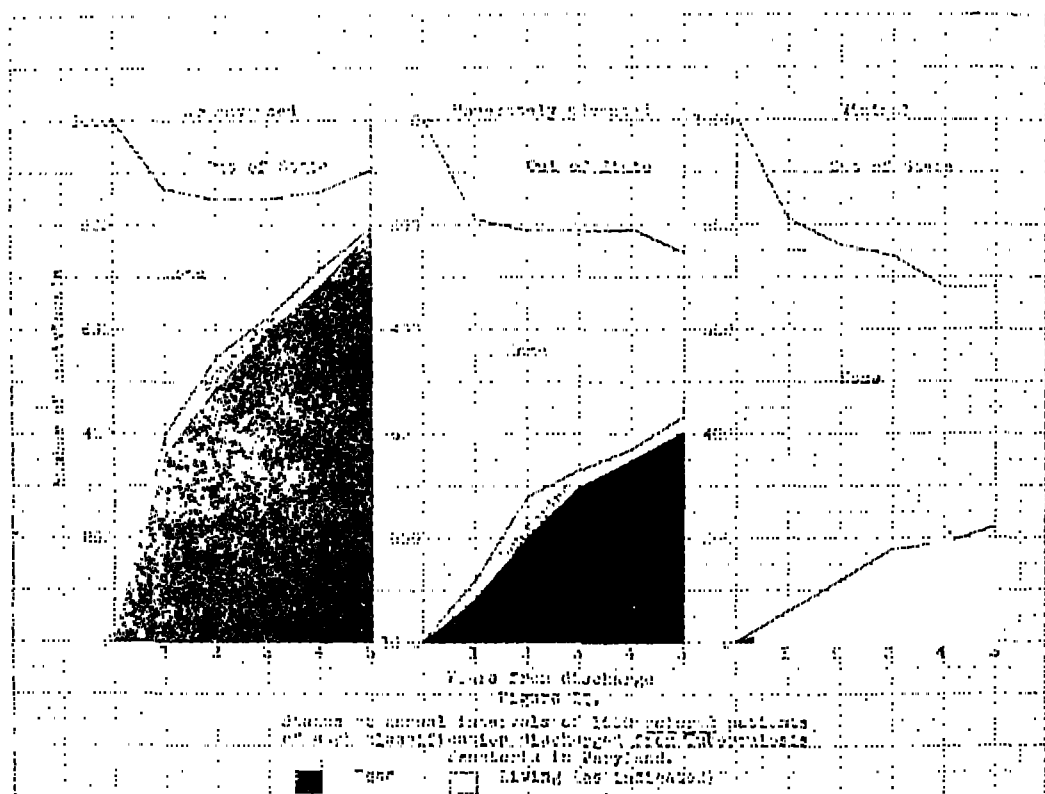
sents 1,000 discharges. The shaded portion of each line represents the number of persons dead from all causes at the end of each given year and should not be interpreted as tuberculosis deaths alone. The number thus represented is cumulative and includes all deaths whether under observation or occurring subsequent to their loss from observation from emigration or from some other cause. The unshaded portion of each line represents the living at the end of the indicated year, and this decreases as the number of deaths increase. This portion of the line has been subdivided according to the residence of the living at the time indicated—at home, in the sanatorium, or out of the state. The number falling into each status is thus represented by the length of the line between the horizontal sectors. This figure demonstrates clearly the relationship which the extent of the lesion has to the subsequent prognosis. The mortality was by far the greatest among those with far advanced lesions. A year following discharge 289 out of 1,000, or 29 per cent, of these white patients were dead, and with the passage of time the number of deaths increased to 622, or 62 per cent, at the end of 5 years. Contrasted with this, of every 1,000 minimal white cases discharged 15, or 1.5 per cent, died within 1 year, and 58, or approximately 6 per cent, died within 5 years. The mortality of those with moderately advanced lesions was such that 67, or 7 per cent, died within a year, and 251, or 25 per cent, within 5 years from discharge. The number of deaths in this group of discharges is somewhat less than found by Hartley, Wingfield, and Thompson<sup>1</sup> among the discharges of Brompton Hospital, England, for the years 1905–1914. Using their basic data, Hilleboe<sup>2</sup> in his comparative study of mortality from different sanatoria calculated the percentage dead at the end of successive

years from discharge. His results are given for each sex but can be readily calculated for both sexes combined. The percentages dead at the end of 5 years in the Brompton study were: far advanced 79, moderately advanced 40, minimal 10. It should be noted, however, that many of the discharges in the Brompton study were observed during the war years and the influenza epidemic of 1918.

In considering the prognosis it should also be noted that the proportion of discharges readmitted to and again resident in the sanatorium at the end of each year was greater among those with the more advanced lesions.

It would appear at first glance that fewer persons emigrated or were otherwise lost from observation among those with the more advanced lesions. In interpreting this section of the graphs marked "Out of State" it is necessary to keep in mind that it represents the proportion of the original 1,000 discharges which have emigrated and are assumed to be still living. The group is made up at any one time of those who have emigrated minus the deaths which would be expected to occur among them at the rates prevailing among those under observation. The force of mortality affects its size in two ways—where the mortality is high the number of potential additions is decreased because fewer survive to emigrate. In addition, with a higher mortality, a greater proportion die after emigration. A calculation based on the proportion of living who are lost from observation shows no difference between the numbers in the various clinical classes. This would indicate that the amount of emigration was not different between the advanced cases and the minimals.

The course of events among the colored discharges is portrayed in Figure II. The picture is in general similar to that shown for the white



discharges, but the mortality from all causes is greater among the colored than among the corresponding white cases. Out of 1,000 colored discharges classed as far advanced there were 360, or 36 per cent, dead 1 year, and 779, or 78 per cent, dead 5 years after discharge. The moderately advanced had 85 deaths, or 8.5 per cent, within 1 year cumulating to 399, or 40 per cent, dead within 5 years, while out of 1,000 minimal discharges 30, or 3 per cent, died in the first year, and 188, or 19 per cent, died within 5 years of discharge.

These comparisons show graphically the relative risk of death among the discharges according to the severity of the lesion but they fail to compare the risk of death among these persons with that prevailing in the general population. In order to make this comparison it is necessary to calculate the deaths which would be expected to occur in a group of 1,000 individuals of the same

race and age composition at the mortality rates from all causes prevalent in the general population of Maryland. This has been done using the Maryland age-specific mortality rates for 1937 to calculate the expected deaths, and a summarized comparison of the observed and expected deaths within 5 years of discharge is shown in Table 2. The observed deaths as compared with the expected are expressed as a ratio, and give an indication of how much greater is the risk of death among these persons than among the general population. It will be noted that among the white the ratio of observed to expected deaths is 13-1 for the far advanced, 7-1 for the moderately advanced, and 1.8-1 for the minimal. These ratios compare with those reported by Hilleboe<sup>3</sup> from Minnesota of 8.7 times the expected for the far advanced, 4.6 times for the moderately advanced, and 1.8 times among the minimal cases. It should be noted, however, that Hilleboe did not

TABLE 2

*Comparison of the Mortality Occurring Over a 5 Year Period Among Patients Discharged from the Tuberculosis Sanatoria in Maryland and that Prevailing in the General Population of the State, by Race and Clinical Stage of Disease*

Clinical Classification	White			Colored		
	No. of Deaths in 1,000 Discharges in 5 Years			No. of Deaths in 1,000 Discharges in 5 Years		
	Observed	Expected *	Ratio	Observed	Expected *	Ratio
Far advanced	622	47	13-1	779	61	13-1
Moderately advanced	251	38	7-1	399	60	7-1
Minimal	58	33	1.8-1	188	52	3.6-1

\* Expected deaths calculated from 1937 mortality rates for Maryland and are age adjusted

include any patients who were subsequently readmitted to sanatoria, and also excluded those discharges with less than 9 months residence in the sanatorium.

Two features of this table are worthy of passing reference. The smaller number of expected deaths estimated for the minimal cases is due to the fact that they are on the whole younger and hence have a more favorable age distribution. The fact that the ratios among the far advanced and moderately advanced is the same for the white and colored is also of some interest. This is in all probability fortuitous and does *not* mean that tuberculosis affects both races equally. The fact that there is in each clinical class a higher mortality among the colored would clearly indicate that the colored race is affected to a greater extent than the white by this disease.

Thus far the analysis has dealt with broad classifications based upon the findings of the examination made in the sanatorium at the time of admission, and no consideration has been given to the condition of the patients at the time of discharge. A further analysis has, therefore, been made of the course of events in *white* persons following discharge in which the extent of the lesion is qualified by a statement as to whether or not the patient improved

under sanatorium care. Such a classification places together in one group all those whose condition at the time of discharge was arrested, quiescent, or improved. It is recognized that the prognosis is different in the case of a person whose lesion has been arrested and one who has improved but where the tuberculous process may still be active. Unfortunately the number of discharges in each group did not warrant separate tabulations, and the comparison is, therefore, much less definitive, being simply between those white persons who did not benefit from sanatorium care and those who showed varying degrees of improvement. This comparison is shown in Figure III, where it will be noted that the number of deaths which occurred over a period of 5 years among the unimproved is twice that which occurred among the improved. Among the far advanced 82 per cent of the unimproved were dead at the end of 4 years as compared with 42 per cent at the end of 5 years among the improved. The improved cases among the moderately advanced showed 20 per cent dead at the end of 5 years compared with 53 per cent among the unimproved, while 10 per cent of the minimal unimproved were dead as compared with 5 per cent of the improved.

The number of deaths occurring over



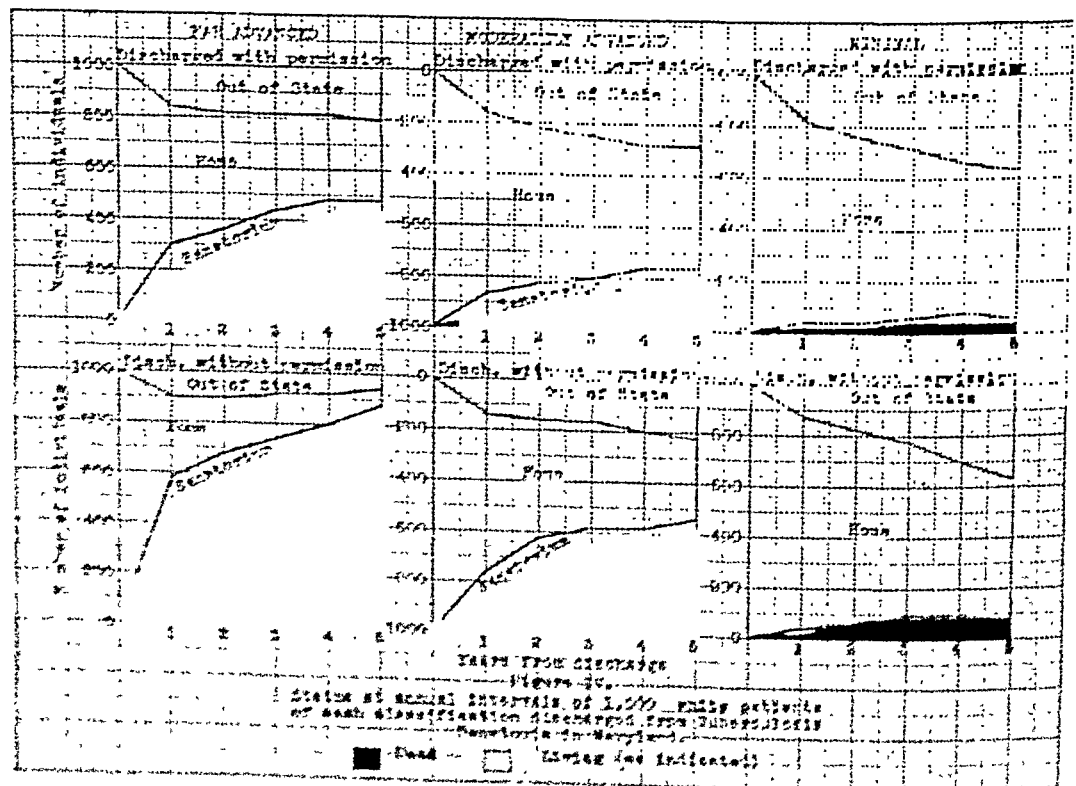
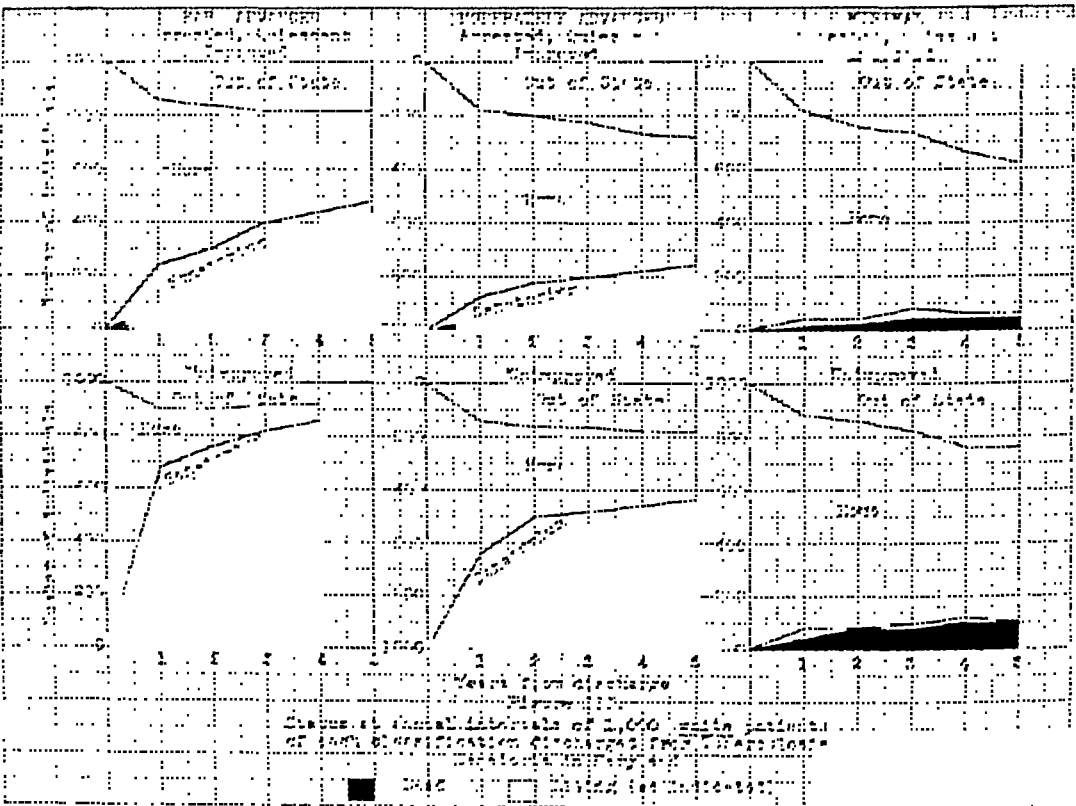


TABLE 3

*Comparison of the Mortality Occurring Over a 5 Year Period Among White Patients Discharged from the Tuberculosis Sanatoria of Maryland and That Prevailing in the White Population of the State, by Clinical Class and Condition at the Time of Discharge*

Clinical Classification	Condition at the Time of Discharge	No. of Deaths in 1,000 Discharges in 5 Years		
		Observed	Expected *	Ratio
Far advanced	Unimproved	818	40	20-1
	Arrested	423	45	9-1
	Quiescent			
Moderately advanced	Improved	534	41	13-1
	Unimproved			
	Arrested	195	37	5.4-1
	Quiescent			
Minimal	Improved	100	30	3.5-1
	Unimproved			
	Arrested	50	33	1.5-1
	Quiescent			
	Improved			

\* Expected deaths calculated from 1937 mortality rates for white population of Maryland and age adjusted

† For 4 years only

the 5 year period (shown graphically in Figure III) has been compared with the number which would be expected in each group at the age-specific mortality rates from all causes in Maryland, and this comparison is summarized in Table 3. This table shows the ratio of risk among the discharges to that in the general population. The ratio of observed to expected deaths is greatest among the far advanced unimproved where over a period of 4 years it is 20 to 1. The moderately advanced unimproved have a ratio of 13-1 and this is higher than the 9.1 of the far advanced improved. Similarly the ratio of 3.5-1 among the minimal unimproved approaches the 5.4-1 of the moderately advanced improved. In the minimal improved group the mortality was one and one-half times that of the general population. The inference to be drawn from this table is that the prognosis can be improved by maintaining tuberculous patients in a sanatorium until they show some degree of improvement.

The course of events among those who left the sanatorium with the permission of the hospital staff is contrasted with that of those who left against advice in Figure IV. The findings in this instance are almost identical with those shown in Figure III, and would seem to indicate that the clinical condition of the patient was, in most instances, the factor which determined whether the authorities granted or withheld permission for discharge.

#### DISCUSSION

Since 1935 all discharges from the Tuberculosis Sanatoria have been followed up on a statewide basis by means of an annual visit by the personnel of the local health department. This is a preliminary report of the analysis of the data collected to date and is mainly concerned with the mortality after discharge among those who had been treated for a definite primary tuberculosis. The percentage of those given a definite diagnosis 5 years of discharge was 100 per cent.

according to their clinical classification, and these percentages were compared with the proportion who would have died had they been subject to the race and age-specific rates of the general population. The mortality expressed as a ratio to that prevailing in the population of Maryland (taken as 1) was:

<i>Clinical Classification</i>	<i>White</i>	<i>Colored</i>
Far advanced	13	13
Moderately advanced	7	7
Minimal	1.8	3.6

The mortality among the discharges who had improved under sanatorium care was only half that experienced by those who were discharged as unimproved.

#### REFERENCES

1. Hartley, P. H. S., Wingfield, R. C., and Thompson, J. H. R. *An Inquiry into the After-Histories of Patients Treated at the Brompton Hospital Sanatorium at Finley During the Years 1905-1914* (No. 85, 1924). Medical Research Committee, Great Britain.
2. Hilleboe, H. E. *Am. Rev. Tuberc.*, 34:713-724, 1936.
3. Hilleboe, H. E. *Nat. Tuberc. A. Tr.*, 34:149-161, 1938.

# Relationship of Public Health Activities to the Real Need\*

W. D. BURKHALTER, M.D., M.P.H.

*Associate in County Organization, Alabama Department of Public Health, Montgomery, Ala.*

TODAY'S health program should meet today's health needs.

Since the purpose of health service is to prevent deaths and illnesses and to prolong lives, primary effort should be directed against those preventable diseases or conditions that are most important from the standpoint of morbidity and mortality.

Smallpox has caused no deaths in Alabama since 1932, and apparently, therefore, is no longer an immediate public health problem. It might even be relegated to the state's list of rare diseases.

Likewise, great effort need not be concentrated on typhoid fever which once caused an enormous loss of life annually. Compared with important health problems, the disease now assumes a very minor rôle; and it appears that most county health departments may cease to spend the major part of the time during the summer months holding county-wide typhoid immunization clinics. Only enough time should be allotted to typhoid control to maintain the present gain.

Since the diphtheria death rate did not exceed 3.5 per 100,000 population in Alabama in 1938 (one-tenth of that of London), there may be cause to be-

lieve that it, too, is a vanishing disease. As a matter of fact, twice as many people died with rabbit fever in Baltimore during 1939 as succumbed to diphtheria.

Every health officer should first study the vital statistics of his city, county, or state, and having determined the facts should set up his program. Results should be compared with costs, and sound planning results in good returns on the investment. Some programs may not be profitable because of the relative insignificance of the problem and, therefore, a relatively small return on the expenditures. Other conditions may cause an infinitely greater life loss and yet adequate control measures have never been formulated. The health officer must, therefore, after studying all problems, decide on the relative emphasis to be placed upon the control of each one.

In 1913, in his address to the Massachusetts Association of Boards of Health, Dr. Charles Value Chapin asked, "How shall we spend the health appropriation?" and added, "All human endeavor is hampered by tradition. Much of the work of health officers is done because it has been done before. Its (the health department's) powers and duties are given to it haphazard, sometimes from terror of an epidemic . . . sometimes because of a

\* Read before the Southern Branch American Public Health Association at the Ninth Annual Meeting in Louisville, Ky., November 13, 1940.

councilman through exuberant enthusiasm or for personal reasons pushes a pet project. . . . The merchant or manufacturer, if he hopes to succeed against competitors, must by good accounting learn which goods yield the highest profit. So the health officer . . . must learn which line of work yields the most for the sum expended." All of us today should still ask ourselves, "How shall we spend the health appropriation?"

Persons, other than statisticians, may be bewildered by the complexity of data presented in an annual report of many state health departments, especially by the difference in the manner of expressing mortality rates due to various causes. For example, the still-birth rate is expressed per 1,000 total births; the infant death rate per 1,000 live births; the total death rate is expressed per 1,000 population; and deaths from specific causes per 100,000 population. These intricate data with which the health worker must deal may be one reason why morbidity and mortality statistics are not used more extensively.

A simple method of showing the relationship of public health activities to the real problem is needed and this is possible by means of an order of rank scale. Studies have already been made on this subject.<sup>2</sup> It is merely a principle of rank and may often be more significant and more readily understood than the actual rate itself. For example, recently we did not succeed in getting increased financial assistance in one county for environmental sanitation by advising the board of revenue that the hookworm rate was 58.7 per cent in school children but got immediate response when it was pointed out that their hookworm problem was the second highest in the state.

By this scale it is possible to express the public health needs, *i.e.*, case and death rates from specific diseases and the activities for meeting these needs in their order of rank.

The data are tabulated or arranged in order from high to low, see Table 1. The highest value for a given index occupies first place, and decreasing values occupy lower places. In this series of comparisons of indices in 18

TABLE 1  
*Maternity*

County	Maternal Com- bination Deaths (1936-38 (100,000 Pop.))	Maternal Com- bination Death Rate (1936-38 (100,000 Pop.))	Order of Rank	Maternal Clinic and Home Visits 1939	Maternal Visit Rate per 100 Pop	Order of Rank	Maternal Visits per Nurse	Order of Rank
Greene	75.3	398	1	245	1.3	11	245	10
Sumter	96.6	356	2	1,960	7.2	1	920	1
Dallas	179.3	324	3	1,013	1.8	6	338	6
Hale	72.6	304	4	587	2.3	3	587	3
Permy	79.3	287	5	406	1.6	8	466	5
Antelope	47.3	239	6	752	3.6	2	752	2
Corn	25.3	222	7	194	1.5	9	194	13
Marion	26.6	212	8	154	0.4	17	154	15/16
Polk	42.6	210	9	246	1.2	12	246	9
Polk	55.6	207	10	566	2.2	4	283	7
Elmore	65.3	201	11	197	0.5	15	100	18
Blair	57.3	199	12	134	0.45	16	134	17
Quinn	40.3	198	13	279	1.4	10	279	8
Waller	121.0	197	14	154	0.2	18	154	15/16
Clay	51.6	195	15	512	1.9	5	512	4
Lamar	35.6	167	16	333	1.7	7	167	14
Polk	33.6	156	17	239	1.1	13	239	12
Tulsa	99.6	125	18	455	0.6	14	242	11

counties in the West Alabama District the lowest value occupies 18th place. The indices for both the needs for services and the activities are arranged in the same order. A county in first place in need should also be in first place in performance.

Median values are readily obtained, and if a specific need is above the median the health services or activities should also exceed the median. These median values of activities might be considered as standards, which have the advantage of not being set arbitrarily. They are records of past performance and will be changed as the performance changes.

Such tables as the two shown here should be of value at the state level in directing the activities of the various specialists to those counties in which their services are most urgently needed. It is believed that more lives could be saved if this policy were carried out. For example, it seems that the associate in charge of maternal hygiene should spend more effort to promote maternal clinics in Sumter County (2nd place in need) than in Fayette County (17th place in need) (Table 1), and this is being done.

We should like to call attention to what would happen if we consider the rate from a maternal combination of causes of death, *i.e.*, stillbirths, neonatal deaths, and maternal deaths. We use this experimental expression to show the number of deaths in this group in terms of unit of population. This affords a rough picture of the importance of the life loss from the maternal combination, compared to that of some specific cause, *e.g.*, smallpox, typhoid, diphtheria, or tuberculosis. The median death rate from maternal combination is 210 per 100,000 population compared to zero for smallpox; 2.3 for typhoid; 2.4 for diphtheria; and 58.9 for tuberculosis. It seems that greater emphasis on maternal hygiene services is universally indicated in view of the great loss of life. Maternal deaths, stillbirths, and neonatal deaths accounted for 16 per cent of the total life loss in Alabama during 1938.

In the past, the tuberculosis traveling diagnostic clinic has operated on a policy of spending two days in each county, twice each year, and at each time about 60 x-ray examinations would be made. It appears (see Table 2) that much more time should be allotted

TABLE 2  
*Tuberculosis*

County	TB Deaths 3 Yr. Aver. (1936-38)	TB Death Rate per 100,000 Pop.	Order of Rank	TB Clinic Visits 1939	TB Clinic Visit Rate per 100 Pop.	Order of Rank	TB Clinic Visits per Health Worker	Order of Rank
Greene	15.6	80.5	1	230	1.2	1	115	1
Dallas	44.3	80.4	2	92	0.67	5	23	17
Shelby	21.6	75	3	136	0.47	9	68	5
Pickens	20.0	74	4	221	0.76	3	74	4
Elmore	25.0	73	5	260	0.75	4	87	2
Lamar	13.3	69	6	126	0.66	6	42	12
Sumter	16.3	60	7	68	0.25	16	22	18
Perry	17.0	59	8	106	0.37	12	53	8
Tuscaloosa	42.6	58.9	9	106	0.15	18	35	13
Hale	13.3	51	10	98	0.38	11	49	10
Marengo	18.0	50	11	59	0.16	17	29	15
Chilton	13.3	49	12	129	0.47	8	64	7
Coosa	6.3	48	13	103	0.78	2	51	9
Walker	29.0	46	14	157	0.26	15	78	3
Autauga	9.3	45	15	64	0.31	13	32	14
Bibb	8.6	42	16	133	0.65	7	66	6
Choctaw	8.3	40	17	58	0.28	14	29	16
Fayette	5.3	26	18	92	0.45	10	46	11

Legend:

- Death rate per 100,000 population (3 yr. av.)
- ▨ Immunization or visit rate per 100 population (1939-39 av.)
- Immunizations or visits per health officer and nurse (1939-39 av.)

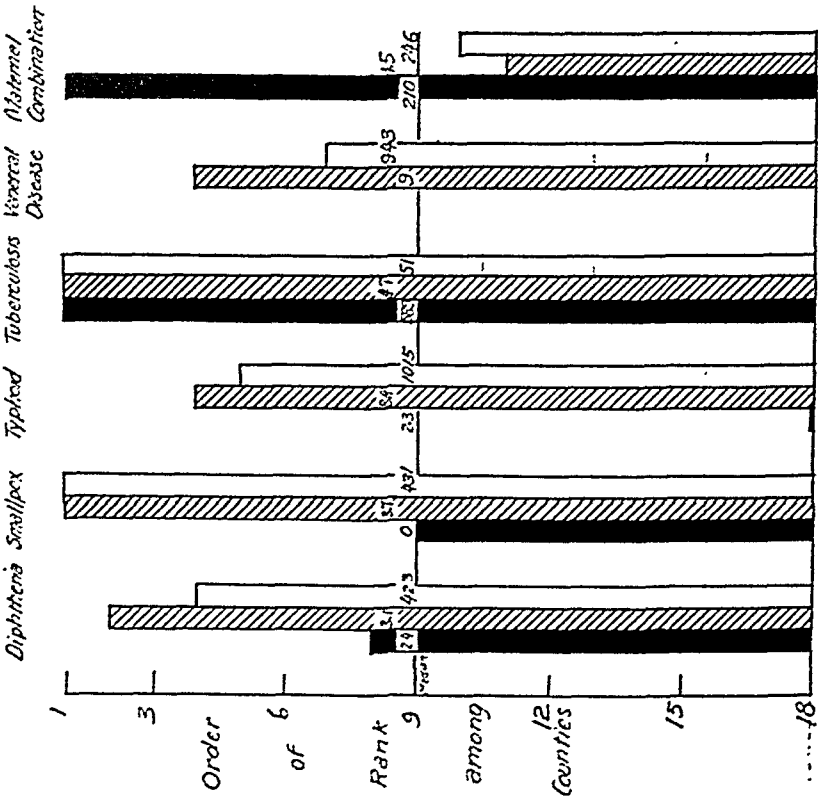


FIGURE 2.—Relationship of public health activities in Greene County, Ala., and the need for service compared with 17 other counties

Legend:

- Death rate per 100,000 population (3 yr. av.)
- ▨ Immunization or visit rate per 100 population (1939-39 av.)
- Immunizations or visits per health officer and nurse (1939-39 av.)

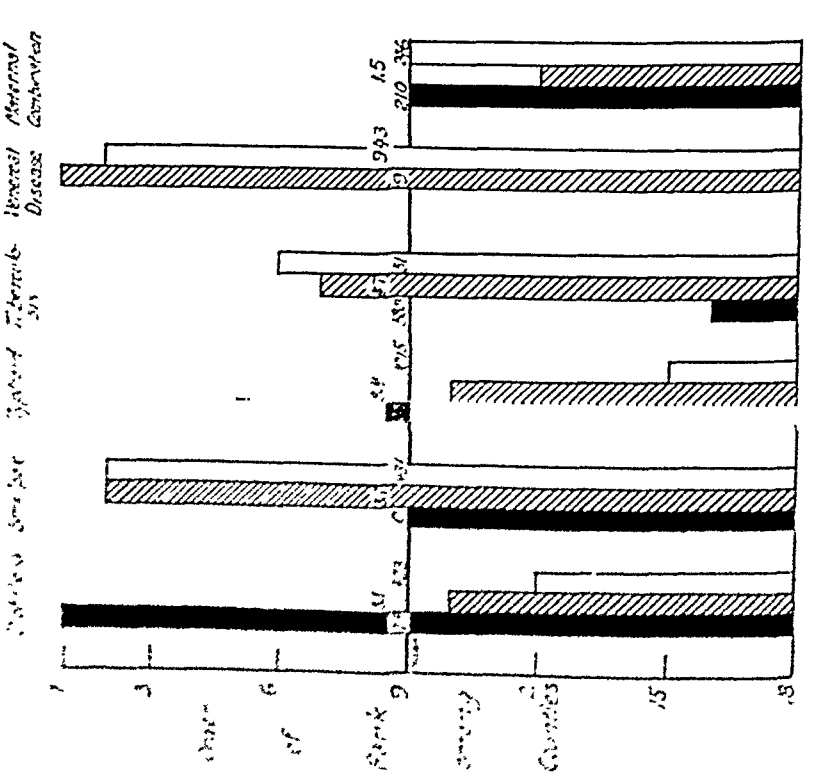


FIGURE 1.—Relationship of public health activities in Bibb County, Ala., and the need for service compared with 17 other counties

to Dallas County (2nd place in need), and that annually proportionately less time should be spent in Coosa County. Tuberculosis kills seven times as many persons in the former county as in the latter. It is anticipated that a change in policy to meet the real need will be established at an early date. Although the tuberculosis death rate has been reduced 75 per cent during the last quarter of a century, it is still an important cause of death.

In order that the health officer may encompass his problems more easily, graphs may be made on the county basis. As illustrations, this has been done in Figures 1 through 3.

Bibb County, as revealed in Figure 1,

ranks in first place in need for diphtheria control but below the median in the immunization rate. On the other hand, although the smallpox mortality rate is zero in all 18 counties and the need for immunization as revealed by this index is the same, the smallpox immunization rate is in 2nd place in this county. It appears that less effort should be spent on this problem and more emphasis placed on diphtheria immunizations. This change in emphasis has already been made. The median performance of smallpox vaccination is approximately twice as many as the number of births, and it seems that this is a satisfactory method of control.

In Figure 2 it is observed that 5 out

of 6 of these selected activities are considerably above the median. In fact, 2 are in first place, and it appears that a great volume of health work is being done. However, the emphasis being given to the maternal problem is not commensurate with the death rate, whereas too great stress is being placed on smallpox and typhoid immunization in view of the need.

Figure 3 reveals a health program that is reasonably well balanced. Here, balance is interpreted as meaning that the

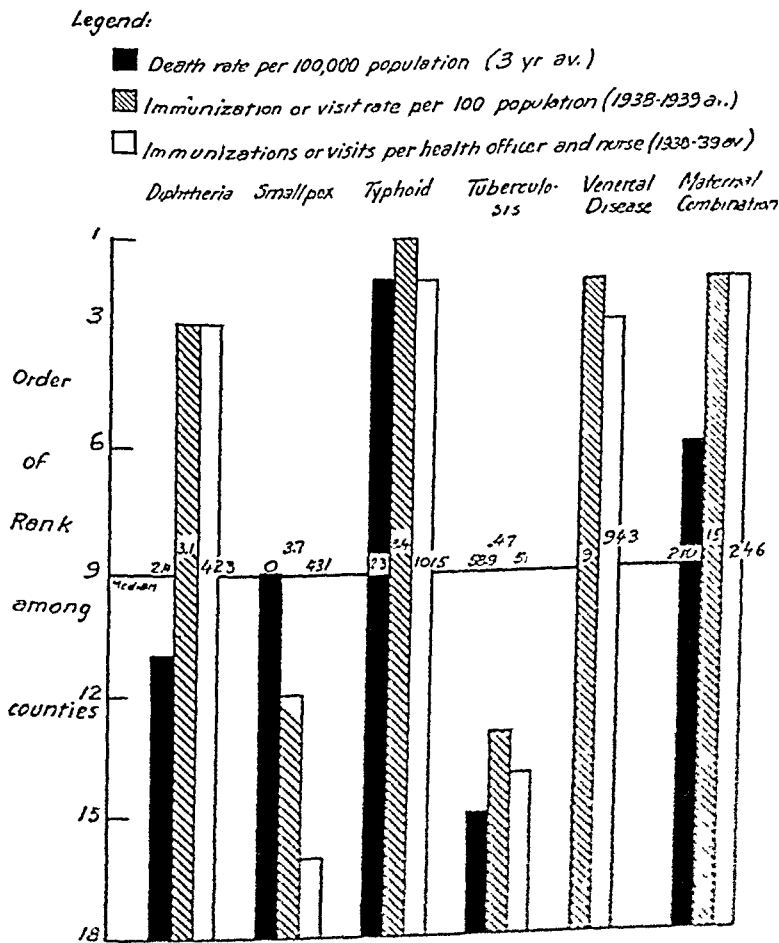


FIGURE 3—Relationship of public health activities in Autauga County, Ala., and the need for service compared with 17 other counties.



public health activities have about the same order of rank as the need for the service, and does not mean that the county is placing the same relative emphasis on all its services.

#### SUMMARY

We have made a study of the relationship of health services to the need, with the aid of a simple order of rank scale. It is obvious that some health programs need replanning. We should determine the greatest cause of illness

and death and battle hardest against those preventable conditions that are bringing about the largest number of casualties. Then there will be the proper relationship of public health activities to the real need.

#### REFERENCES

1. *Appraisal Form for Local Health Work*. New York: American Public Health Association, 1938.
2. Derryberry, M., and Dean, J. O. A Procedure for Putting Health Department Reports to Work. *Pub. Health Rep.*, 54:38 (Sept. 22), 1939.
3. Handley, H. E. *The Field Unit in Local Public Health Service*. Commonwealth Fund, 1938.
4. McLester, J. S. The Changing Picture of Disease in the Southern States. *J.M.A. Alabama*, 10:2 (Aug.), 1940.

# Where Is Dentistry Going in Public Health?\*

NATHAN SINAI, D.P.H., F.A.P.H.A.

*Professor of Hygiene and Public Health, University of Michigan,  
Ann Arbor, Mich.*

IN recent news dispatches from the annual meeting of the American Dental Association the problem of public health dentistry was presented concisely. One speaker reported that when children enter schools approximately 80 per cent are exhibits of dental defects. Another speaker stated that one-fourth of the children in the nation cannot afford dental care and one-half do not obtain it even though they can afford it. The remaining one-fourth receive dental care because their parents are aware of its benefits and are able to afford the services.

Perhaps this is a too-neat division of our population into sharply defined categories—both economic and dental. Undoubtedly one group would blend into the other so that the whole would present itself as showing a range of dental care from none to completely adequate. However, the sharp divisions serve their purpose—they present the problem of public health dentistry as one that concerns at least three-fourths of the nation's school children.

If this were the first instance where statistics of this type had been accumulated, the facts as presented would arouse wide comment in public health. But the instance is neither the first nor

probably the last. Evidence of this sort has been available and it has been discussed for as many years as there have been school health examinations. Out of the discussions there have emerged many programs in public health dentistry. It would be difficult to find another field of public health that shows such a wide variety of activities covered by the same title.

In one community public health dentistry is characterized by the purity of its emphasis on education. The program has to do with the diet, the toothbrush and the emotional values of dental perfection. As an addendum children are advised to see their dentists. This is probably the least common denominator of public health dentistry, but it raises an interesting question: Why does public health dentistry feel that it must occupy the field of general education in nutrition? Probably the nutrition workers welcome the aid, but the reason should be more tangible than that.

Other dental programs expand the definition of education, and the philosophy here is an interesting one. In some instances the educational program includes an examination of the teeth and a recommendation to the parents. In other instances the examination is preceded by an "educational" prophylaxis. And, finally, here and there the prophylaxis and exami-

\* Read before the Oral Health Group of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

nation are followed by the correction of selected defects.

Viewing the problem as a whole, the most significant feature of public health dentistry, except in isolated instances, has been the tendency to avoid the most important pathway to results and to choose instead those by-paths that dodge the main issue. That issue is dental care—regularly in point of time and adequately in point of service. Perhaps the time will come when dental caries will be as preventable as smallpox, but meanwhile the challenge of the 80 per cent of children who enter school exists.

At times public health dentistry has shown an inclination to self-sympathy and to complaint over the lack of consideration given to it by state and local health administrators. Yet, the administrator who is not aware of the existence of the dental problem in his area is rare. It may be of little comfort to the public health dentist, but the real reason for the seeming disinterest is neither outright ignorance nor outright antagonism. It is because the dental problem epitomizes the kind of problem against which the administrator has made little headway—the problem of obtaining corrections of defects after they are found. When an administrator has experienced, year after year, the difficulties of obtaining corrections of eye defects, as but one example, why would he welcome a like problem that is far more complex?

All this presents a rather dark outlook for dentistry as a vital and dynamic part of the public health movement. What has happened during the past decade would support the outlook—in all of the surveys and discussions concerning national health, dentistry itself has shown only a minor positive interest. But something has happened recently that should change the outlook; whether or not it does will depend upon public health dentistry.

The change is one that has taken place not in dentistry but in the public health movement. One of the striking phenomena of the movement has been the redefinition of its scope and its objectives at regular intervals of about twenty years. As knowledge accumulated and brought new work, the definition of 1880 was too narrow to fit the activities, already undertaken by some health agencies, in 1900. In the same manner the scope of public health in 1900, with its emphasis on communicable diseases, failed to cover the new activities of 1920—maternal and infant welfare, school health, etc. Another twenty years have passed and the phenomenon of redefinition again appears. This time it is not something hazy that becomes evident only after a number of years have passed. This time the redefinition takes the form of a remarkable "Declaration of Attitude" appearing in the *American Journal of Public Health* for September, 1940.<sup>1</sup>

This Declaration, if it is approved by the Association, defines the new objectives and the new limits of public health. For the first time the problems of service to the population are considered and are defined as problems of public health. This does not mean that the official public health agency is designated as the only one that should provide service for selected groups; it does mean that the public health agency cannot any longer merely shrug its shoulders and deplore the sad fact that service is not available. This places upon the shoulders of the public health profession the task of studying problems of service and coordinating the efforts to solve them.

In its effect the new definition expands the sphere of public health so that it embraces public health dentistry. But just as the redefinition outlines a huge task for the public health administrator, so does it for the public health dentist.

It is axiomatic in public health administration that little progress can be made unless objectives are clear. Whatever may be chosen as secondary objectives in dental programs, there can be little disagreement concerning what is primary—regular examinations followed by the dental treatment that is indicated.

And now, within the new limits of the public health movement, what responsibilities face the public health dentist? Their scope lies in the statement of policy that is a part of the Declaration of Attitude.

"The responsibility of a community involves procedures that are community-wide in their application . . . and those intended to conserve the health of individuals who, for any reason, are unable to command health protection at their own expense."

It is obvious that the task of acquainting the community with its responsibility falls upon the public health dentist. Heretofore, he has remained aloof from discussions and actions on the subject of medical relief—which probably accounts for the lack of dental care on any but the most meager basis in the majority of relief programs. Yet dental service to the reported 25 per cent who cannot pay depends upon organized community action.

Of course, this immediately raises the important question of professional relations. On this subject the Declaration makes the following forthright statement:

"In deciding whether a given health procedure shall be conducted by the department of health directly or by individual medical practitioners or other agencies, the primary consideration shall be the welfare of the community. Relative cost, relative efficiency, and the practicability of adequate supervision must be considered. Where these factors are reasonably equal preference should be given to a program which decentralizes health procedures so as to enlist the private practitioner in their application."<sup>2</sup>

It is no easy matter to assign precise weights or values to each of the above factors, but the task of collecting the evidence upon which to base values belongs definitely to public health dentistry.

One may agree or disagree with the statement that 50 per cent of the child population go without necessary dentistry even though their parents can afford it. Quibbling about whether the percentage is greater or smaller does not change the problem. It is a problem that calls for the creation of a public demand and an integration of public health and private facilities. It is here that the private practitioner may play his most important rôle, providing not only the necessary services but serving in the capacity of educator as well. Unlike other services, such as immunizations, that are completed either in one visit or within a relatively short space of time, the services of dentistry extend over the life of the individual. Therefore the educational function, once the public health program brings the patient and the dentist together, must be accepted and continued as a routine function of private practice. Some day—and it cannot come too soon—the efficacy of a dental program will be judged not by the number of children that are induced, through one method or another, to undergo their first or sporadic experiences in the dentist's chair. Rather will it be judged by the number that start and continue the visits as a way of life. Obviously such a program calls for and must be based upon a clear statement of policy, a clear understanding and acceptance of the responsibilities of the public health agency and the private practitioners, and an adequate system of records to show the course of progress.

One other point that relates to the "50 per cent group" should be mentioned. The Declaration states that

"many professional societies and lay organizations are also undertaking plans for the provision of medical care on a prepayment or insurance basis for self-supporting persons of small means."<sup>3</sup> Dentistry of any type is excluded from practically all the plans developed thus far. Yet the possibilities of a prepayment plan for certain types of children's dentistry are great. In considering these possibilities the public health dentist may be guided by another paragraph of the Declaration that states—

"Included among the obligations of the medical officer of health to the community is that he inform himself as to the facilities for the general care of the sick, their character and distribution, and that he make use of his position to see to it that any important inadequacies are corrected by appropriate action."

There are few who will disagree with the statement that dental care deserves a high place in the list of "important inadequacies."<sup>4</sup>

It is of more than passing interest that there has been little public demand for solutions of the problems of dental care. There have been no large grants of money to study the national

needs and costs of dental care; there have been no special committees and no special studies to inquire into the dental habits of millions of families. This situation, unlike that in medical care, may be viewed in one of two ways, according to the individual's outlook. It may be viewed as an opportunity for a careful critical analysis and for the preparation of a program that is not distorted by outside pressures and the need for speedy decisions. On the other hand, it may result in the adoption of a philosophy of doing nothing.

The choice of one course or the other will serve as an index of the vitality and the vision of those whose interests are in the field of public health dentistry. And at the same time the choice will determine the answer to the question: Where is dentistry going in public health?

#### REFERENCES

1. An Official Declaration of Attitude of the American Public Health Association on Desirable Standard Minimum Functions and Suitable Organization of Health Activities. *A.J.P.H.*, 30:1099-1106 (Sept.), 1940. (This Declaration was subsequently adopted in revised form and appears in the 1940-1941 *Year Book* of the A.P.H.A., pages 43-50.)
2. *Ibid.*, p. 1105.
3. *Ibid.*, p. 1101.
4. *Ibid.*, p. 1101.

# Public Health and the Law<sup>\*</sup>

JAMES A. TOBEY, DR.P.H., LL.D., F.A.P.H.A.

*Member of the New York Bar, New York, N. Y.*

THE practice of public health is now governed by certain well established legal principles. The important fact is often overlooked by many practitioners of sanitary science, who fail to recognize the legal limitations upon their operations until suddenly they find themselves confronted with embarrassing and costly litigation.

Whenever a court decides that a public health law, ordinance, or regulation is invalid because it is unconstitutional, unreasonable, or otherwise defective; whenever the judiciary enjoins or penalizes the actions of a public health official because they are illegal, capricious, or otherwise improper; the cause of public health may receive a serious setback. Whenever a judicial tribunal awards a judgment against a health officer for the payment of substantial monetary damages to a person who has been injured or aggrieved by the nonfeasance, misfeasance, or malfeasance of that health officer, his usefulness to his community is impaired and his economic security is threatened.

Such distressing events are, fortunately, not frequent, but their occurrence in the past makes it desirable for every practitioner of public health to be thoroughly familiar with the fundamental principles of public health law. This does not mean, of course, that the health official or employee must qualify as an attorney, but it does mean that he should have a practical working

knowledge of law as it applies directly to the conduct of his honorable profession. It means also that whenever the legal necessity arises he should rely upon the advice and counsel of an expert, such as the state attorney general, city solicitor, or his own lawyer.

A working knowledge of legal principles might have prevented the rather disconcerting situation in which the Public Health Council of West Virginia found itself some twenty years ago. Acting under a general health statute which authorized the council to remove from office a city health officer who refused or neglected to observe and enforce the laws and the regulations of the public health council for the control of epidemics, the council initiated action to remove a city health officer because he did not devote full time to the duties of his office. This may have been a worthy endeavor, because full-time service to the public health is a desirable principle, but the health officer in question did not take kindly to the idea. Instead, he contested this court action, and was able to show that he had been legally appointed to his office by the mayor under the provisions of a city charter granted by the state, and that under the terms of the general health law he could not be removed by the state public health council merely because he was a part-time official.<sup>1</sup>

Similarly, a better knowledge of law might have prevented the difficulties in which a health officer in Michigan

<sup>\*</sup> Address at West Virginia State Health Conference, Morgantown, W. Va., November 1, 1940.

found himself during World War I. In his zeal to control the spread of venereal disease this official seized an 18 year old girl, and induced her to submit to a physical examination against her will. Since a gonococcus infection was discovered, she was sent to a hospital where a serological test revealed that syphilis was also present in this patient.

From the standpoint of public health the detention of this infected person was justifiable, but from the standpoint of law it was erroneous. The statute then in force permitted the seizure and examination of an individual only if the health officer had reasonable grounds to suspect the existence of disease. Although this girl received treatment in the hospital for 12 weeks, she ungratefully sued the health officer for assault and false imprisonment. Since the health officer could not show that he had reasonable grounds for suspecting disease in this person, he was adjudged to have exceeded his authority and to have acted in an arbitrary manner. The fact that venereal disease was subsequently found did not excuse the original fault in procedure.<sup>2</sup>

A health official is not personally liable for injury caused to individuals while he is acting in good faith and within the scope of his authority. He is not liable for errors of judgment or for damages resulting from carrying out the orders or policies of the board of health or health department. If, however, he acts in an arbitrary, oppressive, malicious, corrupt, or negligent manner, he may be personally liable for resulting harm to persons or property.

The municipality is not liable to individuals for acts undertaken in its governmental capacity, such as the protection of the public health. It may, nevertheless, be liable for damages resulting from its proprietary or business functions, such as the distribution of water or the disposal of sewage or

waste. On numerous occasions the courts have awarded damages to persons who have contracted disease from city water supplies, or whose persons or property have been harmed by city sewage.

Before taking important action, a health official must, therefore, be cognizant of his actual powers and duties as set forth by law. He must know what the statutes permit him to do or prohibit him from doing, and he must also know what are the constitutional rights of individuals under our system of government. A few years ago, for example, a person in West Virginia was haled into court and convicted of the violation of a municipal ordinance for the regulation of barbering and beauty culture. On appeal, it developed that the ordinance was null and void because it had been repealed by a general state law covering the same subject. The conviction was accordingly reversed.<sup>3</sup>

A knowledge of the statutes pertaining to public health, and the regulations adopted under authority of law to carry out the purposes of health legislation, is useful but it is not enough. The sources of public health law go far beyond such written legislation. They depend in the first instance upon constitutions, both federal and state, in which the authority of government and the duties and rights of its citizens are set forth. Legislation enacted under the authority of a constitution, and enforced by the executive branch of the government, is actually only a small fraction of the jurisprudence of public health.

The great bulk of public health law is made by the courts, whose proper function it is to interpret the laws where necessary, to determine their constitutionality and the validity of their enforcement, and to see that justice and equity are applied under the written law and the unwritten, or common law, in all causes properly brought before them.

Public health law is, therefore, made by all branches of our tripartite system of government. It is derived in part from written statutes enacted by the legislative branch; in part from quasi-legislation of the executive, such as regulations and codes of health departments, which are not actually legislation but which when properly adopted and reasonable in scope are accorded the force and effect of law; and it derives in large measure from the precedents laid down by courts of last resort, both federal and state. Supplementing all of these sources of public health law are the principles of the common law, inherited from England and often modified by our legislation or court decisions in order to comply with the peculiarities of the American way of life.

The courts in West Virginia apparently have been called upon only rarely to adjudicate public health matters, although the courts in other states have handed down thousands of decisions on subjects directly affecting the administration of public health work. Mention should, however, be made of a famous case that was decided in this state more than half a century ago. In 1882 the legislature of West Virginia enacted a law requiring that the practice of medicine in the state should be restricted to persons licensed by the State Board of Health, and that such licenses should be issued only to individuals who had been graduated from reputable institutions or who possessed certain other qualifications.

A physician who had been in practice for some time, and who had been denied a license because he was a graduate of an eclectic medical school which the State Board of Health did not regard as a reputable institution, was haled into court for practice without a license. On appeal from a lower court, the West Virginia Supreme Court of Appeals sustained the validity of the law and up-

held the action of the State Board of Health.

The case was then appealed to the Supreme Court of the United States on the ground that the constitutional rights of this physician had been infringed, in that he had been denied due process of law, as guaranteed to all citizens by the Fourteenth Amendment to the Federal Constitution, which says that no state shall deprive any person of life, liberty, or property without due process of law, nor deny to any person the equal protection of the laws.

The Supreme Court of the United States decided, however, that the West Virginia law was a proper exercise of the police power of the state and that its operation did not deprive the defendant of due process of law.<sup>4</sup> This case, decided in 1889, was the first in which the Supreme Court of the United States upheld the regulation of medical practice by a state, although subsequently this court has sustained the validity of many such laws, whether applied to medicine, osteopathy, dentistry, or other professions, the conduct of which may affect the public health.<sup>5</sup>

Near the turn of the century, the board of health of a city in Massachusetts adopted a regulation to the effect that smallpox was prevalent and that all persons in the city not successfully vaccinated within 5 years should be vaccinated or revaccinated. This regulation was enacted under the authority of a state law which authorized city boards of health to require vaccination of all inhabitants when necessary for the public health, with an exception in favor of children presenting a certificate from a physician showing that they were unfit subjects for vaccination. A penalty was imposed for refusal to comply with the law.

A recalcitrant individual who was opposed to vaccination refused to submit to the regulation and was convicted in the Superior Court. This convic-



tion having been affirmed by the Supreme Judicial Court of Massachusetts, the defendant appealed to the Supreme Court of the United States, alleging that the state law contravened the spirit of the Federal Constitution and deprived him of his rights as a citizen under the Fourteenth Amendment.

In a masterful decision handed down in 1905, which stands as a landmark in the law of public health, the Supreme Court of the United States decreed that the enactment of the law in question was a valid and reasonable exercise of the police power of the state; that its enforcement could properly be delegated to a local board; that the protection of the public health is in the first instance a state responsibility; and that while a court should guard with firmness every right of an individual appertaining to life, liberty, or property, no one person or minority of persons should have the privilege of dominating the majority when supported in their action by the authority of the state.<sup>6</sup> In later decisions this same court has upheld the principle of compulsory vaccination as a public health measure.<sup>7</sup>

Successful immunization of all school children against smallpox, and also against diphtheria, is required by the public health laws of West Virginia. Apparently this excellent legal provision has never been contested in the courts, at least not in the appellate divisions, but it should be upheld as a constitutional exercise of the police power. Only this year, a requirement that vaccination should be a prerequisite to attendance at school was sustained by a federal district court in Pennsylvania and also by the Superior Court of that state. These cases can be added to about one hundred other court decisions on this subject during the last fifty years.

In 1913 the Supreme Court of the United States rendered another notable

decision which sustained a local public health law. In this instance an ordinance of the City of Milwaukee regulated the sale of milk, requiring that no milk should come into the city unless produced from cattle free from tuberculosis as shown by the tuberculin test, and authorizing the confiscation and destruction of milk not produced according to the requirements of the ordinance. Unlike the vaccination case, which dealt with restraint on personal liberty, this case dealt mainly with control of property.

A milk dealer sought to enjoin the enforcement of this ordinance on the ground that it denied him the equal protection of the laws by its failure to apply equally to milk produced within the city, and also because it deprived him of property without due process of law. The Supreme Court dismissed these contentions, saying that there was no illegal discrimination since all cattle outside the city were subject to the same regulations, and that the destruction of any insanitary milk was the only efficient penalty for violation of the ordinance, which was a valid exercise of the police power of the state for the prevention of the spread of disease and the protection of the public health.<sup>9</sup>

What is this police power? It is the power inherent in the state to enact and enforce laws to protect and promote the health, safety, morals, order, peace, comfort, and general welfare of the people. The power was possessed by the states before the Federal Constitution was adopted in 1789, and was not surrendered to the national government at that time. The states cannot, in fact, divest themselves of the police power, including the control of the health of the people.

Public health is, therefore, primarily the responsibility of the states, which may delegate this duty to its political subdivisions and agencies, such as

counties, municipal corporations, boards of health, and school boards. The federal government is concerned with public health only when it affects or is affected by foreign and interstate commerce, when it involves federal territories and wards of the government, or arises under treaties or the federal power of taxation.

Under these powers, as enumerated in the Constitution, the federal government controls foods and drugs in interstate commerce; it taxes and regulates narcotics; prevents the entry of disease from without; provides for the health of the people of the District of Columbia, the non-citizen Indians and Eskimos, and the army and navy. The federal government also coöperates with the states, conducts necessary research, and undertakes public health education. For all of these purposes, it has a number of necessary bureaus and departments, such as the U. S. Public Health Service and the Food and Drug Administration, which are now largely centered in the Federal Security Agency.

Under its constitutional power to levy taxes to provide for the general welfare, the federal government makes grants to the states for maternal and child health, and for assistance to the states in maintaining adequate public health services. These grants are made under the terms of the Federal Social Security Act of 1935 as amended, and are administered by the Children's Bureau of the U. S. Department of Labor, and the U. S. Public Health Service, respectively. The federal government also makes grants to the states to aid in the control of venereal disease.

A recent federal law that has important public health implications is the so-called Selective Service Act of 1940, by the terms of which the young men of the country must register and be selected for service in the army for a

one year period. Since all of the men called for service will be given careful medical examinations, including serological tests, many instances of disease and physical defects will be revealed. Rehabilitation of those found to be suffering from tuberculosis, venereal disease, malnutrition, and other maladies and defects will be an important civil duty.

The health of the men actually enrolled in the army, and the sanitation of their immediate environment are subject to the supervision of the Medical Department of the U. S. Army. The areas outside of the army camps and cantonments remain, however, under the control of civil health authorities, who will be confronted with many acute problems, such as sanitary housing, sanitation of food supplies, control of venereal disease, and various other necessary public health measures. Provision for industrial hygiene in expanding industries made necessary by the military emergency is another urgent health problem. Still another is the matter of adequate and well balanced nutrition for the armed forces, the workers in industry, and the general civilian population.

Practitioners of public health should bear in mind that the police power under which they conduct their functions is broad in scope, is usually construed liberally by the courts, and always gives them ample authority for their operations, but they must also remember that there are limitations upon the police power imposed by constitutions and the common law. Under our form of government, citizens have certain inalienable rights which the courts are zealous to safeguard.

The basis of law is reason. Any public health official whose actions are consistently reasonable, and who operates under reasonable legislation, will invariably avoid serious legal difficulties. Prevention of such difficulties is as im-

portant to successful health administration as are the preventive aspects of public health itself.

## REFERENCES

1. State v. Hall (1920), 86 W. Va. 1, 102 S.E. 694.
2. Rock v. Carney (1921), 216 Mich. 280, 185 N.W. 798, 22 A.L.R. 1178.
3. Morgantown v. Pauley (1934), 115 W. Va. 442, 176 S.E. 857. See S. H. Kress & Co. v. Department of Health (N.Y. 1940), 27 N.E.(2d) 431.
4. Dent v. West Virginia (1889), 129 U. S. 114, 9 S. Ct. 231, 32 L. Ed. 623.
5. Tobey, J. A. *Public Health Law* (2d ed.). New York: Commonwealth Fund, 1939.
6. Jacobson v. Massachusetts (1905), 197 U. S. 11, 25 S. Ct. 358, 49 L. Ed. 643, 3 Ann. Cas. 765.
7. Zucht v. King (1922), 260 U. S. 174, 43 S. Ct. 24, 67 L. Ed. 194. Dictum in Buck v. Bell (1927), 274 U. S. 200, 47 S. Ct. 584, 71 L. Ed. 1000.
8. Marsh v. Earle (Pa. 1938), 24 F. Supp. 385. In re Marsh (Pa. Super. 1940), 14 A.(2d) 368.
9. Adams v. Milwaukee (1913), 228 U. S. 572, 33 S. Ct. 610, 57 L. Ed. 971. See Tobey, J. A. *Legal Aspects of Milk Control*. Chicago: Internat. Assn. of Milk Dealers, 1936.

# An Institutional Outbreak of Poliomyelitis\*

A. CLEMENT SILVERMAN, M.D., F.A.P.H.A.

*Bureau of Communicable Diseases, Syracuse Department of Health and the  
Department of Pediatrics, Syracuse University College of Medicine,  
Syracuse, N. Y.*

IN the epidemiology of poliomyelitis, institutional outbreaks have been comparatively rare. In 1939 R. E. Smith<sup>1</sup> reviewed outbreaks in schools, going back to accounts by Wickman (1905). While for the most part details are meager, mention is made of at least one in an isolated community in 1933 in which no cases occurred except among the school population. In addition to this reference by Smith, there is record of an outbreak in St. Mark's School, Southborough, Mass., in 1936,<sup>2</sup> when, according to a personal communication,<sup>3</sup> the community likewise escaped. The 1934 outbreak of southern California showed a remarkably unique incidence among hospital personnel.<sup>4</sup> Yet even in that outbreak, orphan asylums were spared.<sup>5</sup> In New York City in July, 1923, an orphan asylum having about 300 infants and young children reported 10 cases of paralytic poliomyelitis.<sup>6</sup> Although the usual number of cases were being reported in the city at the time, later that summer there was evidence of a considerable outbreak. In the 1924 outbreak in Syracuse, one orphan asylum had 3 bulbar cases, 2 occurring almost simultaneously and the 3rd, 11 days subsequently.<sup>7</sup>

Last year, Kramer, Gilliam, and Molner<sup>8</sup> reported an institutional outbreak in Detroit, while the disease was prevalent there. There were 34 children in the orphanage of whom 20 were of infant and preschool ages. Between August 1 and 8, 1 fatal and 4 nonparalytic cases developed among young children, aged 1 to 3 years.

The institutional outbreak herein reported occurred in Syracuse early in the spring of 1939, when no other cases were known in the city. In point of time, it came earlier than the Detroit institutional outbreak. But more important, it appears to be the first reported instance of an outbreak, in an orphanage in a fairly large city, occurring seemingly as an isolated episode, without known cases immediately preceding or following in the community at large. The institution consists of a maternity hospital, as a separate unit, and of an orphan asylum having about 120 children ranging in age from new-born infants to 6 years. The set-up of the orphan asylum, the age distribution of the inmates, and their contact with each other and with adults caring for them will be given later.

## STORY OF THE OUTBREAK

The outbreak included 4 infants and 2 young adults. Only 1 of the 6, a maid, escaped muscle weakness or paralysis.

\* Read at a Joint Session of the Laboratory and Epidemiology Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

The unfolding of the outbreak is worth describing, for only 3 of the 6 affected were suspected or recognized as cases, while in the institution. These 3 were infants and were transferred to the City Hospital on April 18, because of paralysis of the lower limbs. Their ages were 7 months, 14 months, and 17 months. The 2 older babies had been in the orphanage since birth, and apparently had their onsets on the same day, April 9. At the City Hospital, their spinal fluid showed increased globulin but no pleocytosis. The 7 months old infant had been admitted to the orphanage on March 27, and had his onset on April 14, and when hospitalized had pronounced nuchal rigidity, pleocytosis (150 cells) and marked globulin increase.

On April 10, 8 days before these babies were admitted to the City Hospital, a 19 year old girl had come to that institution because of stiffness of gait which she attributed to rheumatism of about 2 years' duration. She appeared timid, apprehensive, rather psychoneurotic. Examination revealed, however, absent ankle jerks and a decreased knee jerk on the right. There appeared to be slightly less power in the quadriceps and the iliopsoas groups on the right than on the left. A careful history elicited an acute illness beginning on March 19, with fever and vomiting, and lasting 2 days. After feeling better for 4 days, there was recurrence of the acute symptoms on March 25 and 26, and this episode was subsequently followed by increasing difficulty in climbing stairs, which became pronounced on March 31. It was found that she had been nursemaid in the orphanage from which the babies came and had stopped working there on March 20. Except for the epidemiological relationship, there would have been considerable hesitancy in considering her a case of poliomyelitis, in view of her

illness having occurred in March when no other cases were known and when none would be anticipated in this region.

A visit to the orphanage on April 19 failed to reveal atypical cases or recent minor illnesses, though they could well have been overlooked or misinterpreted, as will be brought out later. One maid, however, aged 24, had become ill and feverish on April 17, the day before the 3 babies were sent in. When seen on the 19th, she complained of headache and pain in the right lower extremity. Her temperature was 103.4, there was tenderness in the right calf and thigh, and her neck was stiff. The spinal fluid showed 130 cells and increased globulin. She gave a history of having had paralytic poliomyelitis 18 years before (1921), and showed residual atrophy and weakness of the extensors of the toes on the left side.

The 6th case lends further uncommon features. She was 21 months old, had been admitted to the orphanage on March 14, having been brought to the city 2 weeks before from a village 30 miles distant. Because she was found to have gonococcus vaginitis she had been transferred from the orphanage March 25. When she was seen on April 2 at the City Hospital, she was found to have a Bell's palsy. Painsstaking questioning failed to reveal any record of fever or illness between March 14 and April 2. Nurses, attendants, and welfare agents had failed to note anything wrong with the child's face, but the attempt to examine her on April 2 caused her to cry, and gave evidence of the paralysis. When the poliomyelitis incidence at the orphanage came to light the writer wondered whether this child, too, represented a case of the disease, having seen 2 cases of poliomyelitis that showed Bell's palsy as the sequel to the acute attack.

Table 1 gives the list of patients in the order of their coming under our

TABLE 1

*Cases of Poliomyelitis in Institutional Outbreak, Syracuse, 1939*

Case No.	Name	Age	Sex	Time in Institution		Illness		Laboratory Investigation						
								Spinal Fluid			Virus Studies			Neutralization for St. Louis and Equine Virus Date
				Entered	Left	Date of Onset	Paralysis or Weakness and Date Noted	Date	Plco cyto-sis	Glob-ulin	Date	Lab. <sup>1</sup>	Stool	
1	E.S.	19 yr.	F	2/ 1/39	3/20	3/19 3/25	Right quad-riceps and iliopsoas 3/31	4/18	Neg.	Pos.	5/2	Yale	Neg.	Serum contaminated 5/2
2	J.E.W.	14 mo.	M	2/ 8/38	4/18 to CH <sup>2</sup>	4/9	Right leg 4/18	4/18	Neg.	Pos.	4/29 4/30	N.Y. Yale	Pos Neg.	Serum contaminated 5/6
3	A.M. McD.	17 mo.	F	11/24/37	4/18 to CH	4/9	Left leg 4/18	4/18	Neg.	Pos.	4/29 4/30	N.Y. Yale	Pos. Neg	Serum contaminated 5/6
4	N.W.	7 mo.	M	3/27/39	4/18 to CH	4/14	Both legs 4/18	4/18	Pos.	Pos.	4/29 4/30	N.Y. Yale	Pos. Neg.	Serum contaminated 5/6
5	J.J.	24 yr.	F	2/ 4/39	4/10 to CH	4/17	None	4/19	Pos.	Pos.	4/22 4/29 5/2	N.I. N.Y. Yale	Pos. Neg. Neg	Neg. 5/2
6	S.C.	21 mo.	F	3/14/39	3/25	Unde-termined	Right facial 4/2	4/30	Neg.	Pos.	4/30 5/11	Yale N.Y.	Neg. Pos.	Neg. 5/5

<sup>1</sup> Yale: James D. Trask and associates; New York: George Y. McClure, Div. of Lab. and Research, New York State Dept. of Health; N.I.: Surgeons Charles Armstrong and R. D. Lillie, Natl. Institute of Health.  
<sup>2</sup> CH—City Hospital.

observation. For each, certain personal data are given, together with the time in the institution, the onset date, the nature of the attack, and the various laboratory tests to be discussed later. From the dates of onset, it can be seen that the outbreak extended from March 19 to April 17. The patient (case No. 1) whose onset occurred on March 19, left the orphan asylum the next day, and hers was the so-called dromedary type, the symptoms recurring after 4 days and going on to muscular weakness. One infant (case No. 6) entered the institution March 14, 5 days prior to the onset of the first case, and no onset date can be ascertained for her, but the fact that after remaining 11 days in the orphanage, paralysis was noted by April 2, and that in the first case the weakness became evident March 31,

suggests that possibly their onsets were close together. One infant (case No. 4) who entered on March 27, became ill 17 days later. The one non-paralytic case represented a second attack, the first having ended in paralysis. One case (No. 6) with Bell's palsy as a sequel has been mentioned.

#### THE ORPHAN ASYLUM

In the orphan asylum, during this period, there were 117 children, divided as follows: kindergarten 31, preschool 32, second nursery 17, first nursery (infants under 1 year) 20. In addition, 17 children of all ages (may ordinarily range from 1 day to 6 years) were in the hospital section either because they were ill or because they were new admissions and by law had to be quarantined. The institution takes in nurse maids for a year's training and

experience and there were 26 at the time. There were also 2 teachers for the kindergarten and 4 adults who, having general supervisory functions, had access to all the children. Twelve or more cleaning women and 11 part-time workers may also have had some contact with the children. In the course of the period under discussion, comprising 27 days, there were 12 admissions, 14 releases, and 1 death. Three of the admissions were from out-of-town and 4 of the releases were to out-of-town places. The death was that of a child approximately  $2\frac{1}{2}$  years old, and occurred on March 30. The death certificate gave bronchopneumonia of 2 days' duration as the cause; no details could be elicited that would connect it with the outbreak of poliomyelitis.

Of the 4 infants in the poliomyelitis outbreak, 3 came from the hospital section and 1 from the preschool group. The first maid who became ill served the preschool group. The second adult worked in the laundry but came in contact with the children whenever she visited her own baby in the first nursery. While the entire institutional population might be considered as having been at risk, the preschool and hospital groups comprising 49 children and 19 to 23 adults had 5 of the 6 cases. The children in the five divisions or groups were kept separate, but the adults serving the different groups had some contact with each other.

No definite isolation technic was maintained even in the hospital group. Children who became ill often remained with their group for several days before being removed to the hospital section. An illustration is afforded by an outbreak of hemolytic streptococcus infection which occurred at about the same time and which came to light during the investigation of the poliomyelitis outbreak. A nursery maid in the second nursery became ill

with sore throat on January 31, 1939. She was still working there when a scarlatinal rash appeared on February 2, and she was sent to the City Hospital on that date. Although no other cases of scarlet fever were reported from the institution subsequently, there were 27 cases of otitis media among the older infants, and preschool children during February, March, and April, and 16 mastoid operations were performed during these 3 months; in fact, the first case of poliomyelitis recognized was an infant (case No. 2) whose mastoid wound was still being dressed and who on April 18 was unable to stand up, whereas he had been able to stand at the time of the previous change of dressing.

#### LABORATORY INVESTIGATIONS

Because of the unusual time and nature of the outbreak, it was imperative that some confirmatory tests be applied. The essential changes in the cerebrospinal fluid are indicated in Table 1, but such changes are suggestive only and do not constitute evidence of the disease. The recently renewed interest in the test for poliomyelitis virus in stools<sup>9</sup> suggested that as the most appropriate. Dr. James D. Trask and his associates at Yale and Dr. George Y. McClure of the New York State Laboratory kindly offered their facilities. Fecal specimens were sent to both at about the same time (April 29-30). Negative results were reported by the Yale group from all 6 cases as well as from 9 contacts. Dr. McClure, to whom specimens were sent from all cases except the first, reported positive results with specimens from cases Nos. 2 and 3, and also from case No. 6 who had only the facial paralysis and whose specimen was submitted May 11.

The monkeys inoculated with extracts of fecal specimens from these cases, developed clinical symptoms of polio-

myelitis, and sections from their spinal cords were found to have lesions characteristic of poliomyelitis, including neuronophagia in the anterior horns. The monkey inoculated with the specimen from case No. 4 had an elevation of temperature corresponding to that which occurred in the other monkeys, but did not develop paralysis; sections of the cord were reported on June 10 as inconclusive. But all 4 gave positive second passage. The monkey inoculated with the specimen from case No. 5 of April 29 did not develop any rise in temperature or other symptoms of the disease. Nasal washings and enema return from this case, however, were refrigerated and shipped to Dr. Charles Armstrong at the National Institute of Health on April 22, the 5th day since her onset of symptoms. Dr. Armstrong reported no success in isolating virus from the nasal washings, but from the stool a paralytic affection was transferred through three generations in monkeys, "in which both the clinical picture, and pathological findings as reported by Surgeon R. D. Lillie were consistent with a diagnosis of poliomyelitis. The agent was not pathogenic for white mice." This would seem to constitute evidence of an attack of poliomyelitis, and since she had residual evidence of a first attack, the second attack may be considered established.

Early in May serum from all 6 cases was sent to Dr. Karl F. Meyer for neutralization tests against the virus of St. Louis encephalitis and equine encephalomyelitis. Four specimens unfortunately were found contaminated, but the ones for the patient with facial paralysis and the adult with the second attack (cases Nos. 5 and 6) were reported to be entirely negative in relation to these viruses. The results of the several tests are included in Table 1.

It should be stated, incidentally, that

at the suggestion of Dr. Trask, two sets of fecal specimens from the infants were sent to Dr. Norman R. Stoll of the Rockefeller Institute for Animal and Plant Pathology at Princeton, N. J., for helminthological examination, and the results were reported negative.

#### COMMENT

It is not the purpose of this paper to enter into a discussion of the technical features of the laboratory tests, especially as applied to the specimens of feces. Since these tests were not done in Syracuse, reference may be made to the latest report of Trask and his associates<sup>10</sup> and to the details of McClure's technic.<sup>11</sup> It is desired, however, to emphasize: (1) the "use of the fecal examinations as an epidemiological tool,"<sup>10</sup> and (2) the rôle of epidemiology as a diagnostic aid. In Kramer's report,<sup>8</sup> the stools identified healthy contacts and undiagnosed minor illness. In this Syracuse outbreak 3 of the 6 cases would have been considered doubtful without the stool examinations. The different results obtained in specimens from case No. 5, on April 22 and April 29, might have been due to the longer interval since onset. The evidence that virus was present on the 5th day and absent a week later may also tend to refute any suggestion that she might have been a chronic carrier owing to her paralytic attack 18 years earlier.<sup>12</sup> On the other hand, the positive stool from case No. 6 was obtained 17 days after she left the orphan asylum. The 3 cases which could easily have been overlooked as possible cases of poliomyelitis, had it not been for the epidemiologic relationships, might have remained doubtful diagnoses without stool examination for virus.

#### SUMMARY

An outbreak in a child caring institution in a fairly large city, apparently



occurring as an isolated episode, at an unusual time, is described seemingly for the first time.

It represents on a small scale a community outbreak, and shows a comparatively high incidence and paralytic rate.

The failure to note minor illnesses or so-called abortive cases may well have been due to faulty observation of the inmates or to misinterpretation of the symptoms, since an outbreak of hemolytic streptococcus infection preceded the poliomyelitis outbreak.

Three of the cases were sufficiently atypical to have escaped diagnosis: a "dromedary" case with slight muscle weakness, a case of Bell's palsy without any recognition of invasive symptoms, and a non-paralytic attack 18 years after a paralytic attack.

The finding of poliomyelitis virus in the stools of 2 of these 3 cases, in addition to the 3 frank cases, emphasizes its significance as an epidemiological tool. Further, the epidemiologic approach served as an aid in diagnosis.

Finally, the facts developed in this outbreak appear to support the view that the poliomyelitis infection was spread by direct personal contact.

**ACKNOWLEDGMENTS**—Thanks are due to Dr. Ernest L. Stebbins, Secretary of the Epidemiology Section who, as former Assistant Commissioner for Communicable Diseases, New York State Department of Health, was keenly interested in this institutional outbreak and facilitated many of the laboratory investigations. I am indebted to Dr. James D. Trask and his associates; to Dr. George Y. McClure, Senior Medical Bacteriologist, and the Division of Laboratories and Research, New York State Department of Health; to Dr. Charles Armstrong, Senior Surgeon, National Institute of Health; to Dr.

Karl F. Meyer, George Williams Hooper Foundation; and to Dr. Norman R. Stoll of the Rockefeller Institute for Animal and Plant Pathology. Thanks are also due to my associates in the Syracuse Health Department and the City Hospital, to Dr. O. D. Chapman of the City Laboratory and to the hospital nursing and interne staffs for their interest and assistance in securing specimens.

#### REFERENCES

1. Smith, R. E. Discussion on Epidemiological Problems of Poliomyelitis in Schools. *Proc. Roy. Soc. Med.* (Session of Jan. 27, 1939), 32 (part 1): 423-32 (Mar.), 1939.
2. Anterior Poliomyelitis with Special Reference to Its Effects on Schools. *Guy's Hosp. Rep.*, 89: 139-72 (Apr.), 1939.
3. Annual Report of the Department of Public Health for the Year Ending November 30, 1936, Commonwealth of Massachusetts, *Public Doc. No. 34*, p. 77.
4. Feemster, Roy F. Personal communication.
5. Leake, J. P., Ceder, E. T., Dearing, W. P., Gilliam, A. G., and Chope, H. D. Epidemiology of Poliomyelitis in California, 1934. *A.J.P.H.*, 24: 1204-6 (Dec.), 1934.
6. Gilliam, A. G. Epidemiological Study of an Epidemic, Diagnosed as Poliomyelitis, Occurring Among the Personnel of the Los Angeles County General Hospital During the Summer of 1934. *Pub. Health Bull.*, No. 240 (Apr.), 1938.
7. Stevens, George M. The 1934 Epidemic of Poliomyelitis in Southern California. *A.J.P.H.*, 24: 1213-14 (Dec.), 1934.
8. Bloomberg, M. W., and Barenberg, L. H. Report of an Outbreak of Poliomyelitis in a Child-caring Institution. *Arch. Pediat.*, 41:339-42 (May), 1924.
9. Silverman, A. C. Acute Poliomyelitis in Syracuse, New York: Clinical Analysis of Five Successive Outbreaks, from 1922 to 1929, with Special Reference to Epidemiology and Treatment with Serum. *Am. J. Dis. Child.*, 41:829-861 (Apr.), 1931.
10. Kramer, S. D., Gilliam, A. G., and Molner, J. G. Recovery of the Virus of Poliomyelitis from the Stools of Healthy Contacts in an Institutional Outbreak. *Pub. Health Rep.*, 54:1914-1922 (Oct. 27), 1939.
11. Trask, James D., Vignec, A. J., and Paul, John R. Poliomyelitis Virus in Human Stools. *J.A.M.A.*, 111:6-11 (July 2), 1938.
12. Kramer, S. D., Hoskwith, B., and Grossman, L. H. Detection of Virus of Poliomyelitis in Nose and Throat and in the Gastro-intestinal Tract of Human Beings and Monkeys. *J. Exper. Med.*, 69:49-67 (Jan.), 1939.
13. Tra k, J. D., Paul, J. R., and Vignec, A. J. I. Poliomyelitis Virus in Human Stools. *J. Exper. Med.*, 71:751-63 (June), 1940.
14. McClure, G. Y. To be published.
15. *Poliomyelitis*. International Committee for the Study of Infantile Paralysis, Baltimore. The Williams and Wilkins Co., 1932, Chap. VII, pp. 379-89.

# Epidemiological Investigation of Rural Typhoid with the Aid of the Vi Agglutination Test\*

CALISTA P. ELIOT, Sc.D., AND W. ROSS CAMERON, M.D.

*Associate in Bacteriology, School of Hygiene and Public Health, the Johns Hopkins University; and Deputy State Health Officer, Hagerstown, Md.*

WITH reasonable skill in the application of laboratory methods developed during recent years for the isolation of typhoid bacilli from stool and urine specimens, it is probably safe to assume that the typhoid bacillus can be detected if it is present even in minimal numbers in the portion of material examined. This lends assurance of significance to both the positive and negative stool cultures. There still remain, however, certain practical limitations in the use of stool examination as a primary epidemiological tool for the detection of typhoid carriers. These may be listed as follows:

1. Questionable authenticity of specimen unless collected under strict supervision.
2. Intermittency, either apparent or real, in the elimination of typhoid bacilli by the carrier.
3. A time-consuming and expensive laboratory technic for large-scale application.
4. Esthetic distaste for procuring specimens on the part of many individuals.

The application of a serological method in the laboratory examination for carrier detection would largely eliminate these objections. Various

serological tests have been proposed and tried from time to time. A method widely applied and generally considered to be most useful is the agglutination test by which the H and O typhoid antibodies are detected individually with living or killed antigen. Accumulated experience indicates that the typhoid carrier usually shows typhoid agglutinins in the blood, presumably throughout his lifetime. However, since demonstration of agglutinins is at best only indirect evidence of either past or current presence of the organism, the method can serve merely as a screen test, and a series of stool specimens must be examined to determine whether the carrier state actually exists in the individuals under consideration.

The H and O antibody method for detection of carriers is open to one serious objection in all areas where typhoid inoculation is widely practised, or where the endemic typhoid rate is, or has been, high. Under either of these conditions the number of positive reactions is found to be so far in excess of the number of possible carriers that there is actually little advantage in the use of the method as a preliminary or screen test.

Recently another agglutination reac-

\* Read at a Joint Session of the Laboratory and Epidemiology Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 11, 1940.

tion has been applied which gives promise of showing greater specificity. This is the test for Vi agglutinins described by Felix,<sup>1</sup> Bhatnager,<sup>2</sup> Eliot,<sup>3</sup> and others. It has been shown that Vi agglutinin is usually present in the blood of carriers and of typhoid cases, and that it is absent in other individuals including those inoculated with vaccine. The positive Vi test therefore constitutes presumptive evidence of the presence of the typhoid organism in the host and must be confirmed by stool or urine or bile culture.

In this paper a report is made upon the use of the Vi test in epidemiological investigations on endemic typhoid in what has been termed a "typical rural county"—Washington County, Md. Results are compared with those obtained by other methods in investigations during the past 10 years in the same county. During this period comparable laboratory methods have been used for stool examinations, providing a reasonably uniform basis for comparison of results. Moreover, one of us (W. R. C.), has served as epidemiologist during the entire series of investigations and there is every reason to believe that throughout the period under review the intensity of effort to discover carriers has varied but little.

#### CARRIER IDENTIFICATION METHODS AND RESULTS

The search for typhoid carriers in Washington County has been carried on intermittently as typhoid cases occurred from time to time to furnish the basis for initiation of an investigation. During the first few years of the 10 year period under discussion, and in certain areas later, all laboratory examinations were confined to stool and urine cultures. Specimens were secured in bile or bile brilliant green preservative from all persons in the affected households and from selected individuals in the community, particularly from those

who previously had been reported as having had typhoid. There were 515 persons examined by this method, of whom 4 were identified as typhoid carriers. In a number of epidemics no typhoid carrier was discovered.

The serological screen test, in which blood from suspected carriers was examined for H and O antibodies, was adopted for typhoid investigation, beginning in 1933. If agglutination of either H or O antigen was produced in a titer of 1:80 or higher, specimens of stool were collected and examined for *Eberthella typhosa*. In most instances persons with negative reactions were not asked to submit stool specimens. After trial in a number of investigations over a period of 4 years, the use of the method was discontinued. No carriers were found among the 354 persons examined, although 70, or nearly one-fifth of them, showed H or O antibodies in significant titer. It was concluded that these blood tests were relatively unfruitful as a preliminary means of identification of carriers, and the practice of primary stool collection from all suspected persons was resumed.

From 1937 to 1939 the Vi agglutination reaction was employed as a screen test in the investigation of seven endemic areas. Specimens of blood were obtained as for any serological test, from contacts of cases and from other suspected persons. The H and O antibodies were removed by a simple absorption technic, and the Vi antibody titrated by agglutination with a living typhoid culture, rich in Vi antigen. When agglutination was positive in a titer of 1:20 or higher, stool specimens were collected and cultured for typhoid bacilli. Persons in this series showing negative agglutination were also examined by stool culture. Among 100 persons studied, 4 were identified as carriers in four different epidemics. All of them had shown positive Vi agglutination. Four other individuals showed

positive reactions but typhoid bacilli could not be isolated from their stools. It is not impossible that further investigation will reveal one or more of these persons to be excreting typhoid bacilli. Each of them is reasonably connected by epidemiological data with previous typhoid cases. On the other hand, it can be demonstrated that a certain number of normal individuals with no known typhoid contacts or history may possess Vi agglutinin in significant titer. In a study now in progress this number comprises about 5 per cent of normal persons examined, as compared with more than 80 per cent of positive reactions among reported carriers.

would appear that, in addition to the selection of a far too large number of normal persons for further investigation by stool culture, the H and O test may also err on the other side by failing to point out certain carriers as "suspects." whether this failure actually occurred in the reported group cannot now be ascertained. In any case the H and O test failed to serve as a satisfactory screen for the selection of possible carriers in these investigations, because although no carrier was discovered among 354 persons incriminated on epidemiological grounds, 19 per cent showed antibody titers considered significant of possible infection. On the other hand, when the

TABLE 1

*The Serological Screen Tests Compared with Respect to Number of Positive Tests and Number of Carriers Detected*

Method	Blood Examination			Stool Culture	
	Number Examined	Number Positive	Per cent Positive	<i>E. typhosa</i> Isolated	Per cent Carriers among Positive Blood Tests
H & O	354	70	19	0	0
Vi	100	8	8	4	50

The results obtained when the two serological screen tests were used in typhoid carrier investigations are summarized in Table. 1. The difference in the proportion of positive agglutination reactions in the two tests is at least in part a reflection of the widespread administration of typhoid vaccine in Washington County. This practice has elevated the H and O antibody content of many of the inoculated persons and greatly lessened the diagnostic significance of agglutination with these antibodies. There is no evidence that the Vi agglutination reaction is similarly influenced by inoculation with typhoid vaccine. It should also be reported that in two instances in which the Vi agglutination test was positive and *Eberthella typhosa* was isolated from the stool, the O agglutination test was negative in a dilution as low as 1:40. It

Vi test was applied as a selective screen. only 8 per cent of the persons examined were brought under suspicion by the serological test, and 50 per cent of these were proved actually to be typhoid carriers by isolation of *Eberthella typhosa* from stool and urine cultures. The investigations in Washington County in which the Vi test was used to detect carriers were undertaken in areas where typhoid had been endemic for many years, and where repeated previous attempts to locate carriers had failed. Except in rare instances it is not possible to say whether these investigations involved the same persons at different times. It is probable that in some areas this happened more frequently than in others. In each instance the reason for making the investigation was the report from a physician of one or more cases of

typhoid fever in that particular area, and not infrequently cases occurred from year to year in the same family or among neighbors.

Carriers were discovered in four of the seven areas studied. Brief descriptions of the four successful investigations are herewith presented.

VI REACTIONS IN EPIDEMIOLOGICAL INVESTIGATIONS

*Tonoloway Area*

Tonoloway is an isolated mountainous section about 35 miles west of Hagerstown. Twenty-eight families totalling about 125 persons inhabit this cluster of small farms. Prior to 1931, typhoid had not been reported there. From 1931 to 1937 there were 25 reported cases. This distribution by years is shown in Table 2.

TABLE 2  
*Tonoloway Area—Reported Cases of Typhoid Fever*

Year	Total Cases
1931 . . . . .	3
1932 . . . . .	6
1933 . . . . .	5
1934 . . . . .	4
1935 . . . . .	1
1936 . . . . .	0
1937 . . . . .	6

Cases were confined to 12 households. Arranged in chronological order, it was observed that the age of the first case developing each year ascended from 8 years in 1931 to 15 years in 1937. On the basis of this evidence it was hazarded that a person of about 15 years of age might be the source of infection.

In earlier outbreaks the routine detection measures previously outlined were un-successfully attempted. When the first case appeared in June, 1937, blood from 15 persons in the community was examined for Vi antibodies by one of

us (C. P. E.). Quite independently, specimens of stools were examined at the Hagerstown Branch of the Maryland State Department of Health Laboratory. Positive findings were reported on both blood and stool specimens in a 15 year old girl. This person was found to have been the first reported case in 1931. She appears to have been the source of at least 24 other cases. In two previous investigations, stools from her had been examined and found to be negative.

The carrier was admitted to the hospital, and *Eberthella typhosa* was recovered from gall bladder drainage. At operation, the gall bladder was found to contain many small stones, and a pure culture of typhoid organisms was isolated. Stools were consistently negative for 6 weeks after the operation. During that time the Vi antibody titer fell slowly, but it has not been possible to obtain specimens in recent years to follow subsequent progress. No new cases have been reported in that area since 1937.

*Pinesburg Area*

Pinesburg is an isolated community about 9 miles south of Hagerstown. In the area are about 50 families totalling 265 persons. Typhoid has been reported in this village nearly every year since 1924 to a total of 46 cases. The distribution by years is indicated in Table 3.

TABLE 3  
*Pinesburg Area—Reported Cases of Typhoid Fever*

Year	Total Cases	Year	Total Cases
1924.....	4	1932.....	11
1925.....	1	1933.....	1
1926.....	7	1934.....	0
1927.....	4	1935.....	0
1928.....	12	1936.....	0
1929.....	1	1937.....	1
1930.....	3	1938.....	1
1931.....	0	1939.....	0

Since 1930 at least three searches for carriers have been made in Pinesburg, and more than half the population has received one or more series of typhoid

vaccine inoculations. When no infections were reported in 1934, 1935, and 1936, it was assumed that the carrier had either died or moved from the area.

In 1937, however, another case occurred, and another unsuccessful investigation was made. When a case was reported in 1938, blood was obtained from other members of the household concerned, and from several neighbors who gave a history of typhoid. These specimens were examined for Vi antibody with negative results. Blood samples were then obtained from 29 WPA workers with whom the patient had been associated for 6 weeks before the onset of illness. A positive Vi reaction was found in a white male, age 25 years, a neighbor of the patient, who had previously been interviewed as a neighbor but from whom a specimen of blood had not then been requested because he said that he had not had typhoid fever. Stool samples were promptly obtained from him and *Eberthella typhosa* was isolated without difficulty. Stool specimens from the 28 others working on the same project were negative. In this investigation 36 samples of blood were examined, of which 34 were negative for Vi reaction, and 2 were positive, the index case and the carrier.

The carrier was admitted to a hospital and *Eberthella typhosa* was found in material obtained by gall bladder drainage. A history of possible gall bladder disease was elicited from the patient. At operation the gall bladder was hypertrophied, bound down by adhesions, and contained many stones. *Eberthella typhosa* was recovered from the contents. Two months after the operation the patient's blood still gave a positive Vi reaction in high titer. Nine months later the blood showed a borderline weak reaction. Repeated stools were negative. No new cases have been reported in that area since the operation on the carrier in 1938.

This carrier had lived in three different houses in Pinesburg from 1923 to 1934, and at each move typhoid cases occurred in the new household or in the neighborhood. In 1934 he enlisted in the United States Army for a period of 3 years because, he said, typhoid fever seemed to follow him wherever he went, and when he read that the disease was almost unknown in the Army he decided to enlist to try to get away from it.

In this investigation and in the one previously outlined, the carriers were identified so rapidly that they were admitted to the hospital about 10 days after the cases for which they were believed to be responsible.

#### *Maugansville Area*

Maugansville, a village 6 miles north of Hagerstown, consists of about 120 families with an estimated population of 550. It is a relatively wealthy community of high sanitary status. Thirty-six cases of typhoid fever have been reported there from 1930 to 1938 distributed by years as shown in Table 4.

TABLE 4  
*Maugansville Area—Reported Cases of Typhoid Fever*

<i>Year</i>	<i>Total Cases</i>
1930 . . . . .	2
1931 . . . . .	29
1932 . . . . .	0
1932 . . . . .	1
1933 . . . . .	0
1934 . . . . .	0
1935 . . . . .	3
1936 . . . . .	0
1937 . . . . .	1
1938 . . . . .	1

The outbreak in 1931 was extensively investigated. It seemed to have the characteristics of a water-borne infection. All the early cases lived near the community well and all drank frequently from it. There was no common milk supply, or public gathering which all had attended. Many of the citizens vigorously declined to submit specimens

of stool, preventing satisfactory completion of the investigation. Following the report of cases in 1933 and 1936, investigations were seriously curtailed for the same reason.

In 1938, 15 blood samples were secured from the household and community contacts of the patient. Two of these were positive for Vi antibody and 13 were negative. *Eberthella typhosa* was recovered from the stool of one of the persons showing a positive test, a white female, 68 years of age. The distribution of the cases is such that this person could have been responsible for all cases in the series, including the supposed water-borne epidemic. The other positive Vi reaction has not, as yet, been explained. All persons showing negative Vi tests also had negative stools.

#### *Sideling Hill Area*

Sideling Hill, an isolated mountain hamlet, comprises a group of about 20 houses inhabited by approximately 100 people. Typhoid fever has appeared there at intervals for the past 10 years. Following the report of a case in 1939, 10 blood specimens were examined for Vi agglutinin, of which 8 were negative and 2 were positive. *Eberthella typhosa* was found in the stool of one of the persons showing a positive test, a white female, age 58 years, who had lived in the same locality all her life. A high proportion of the total reported cases were among relatives or neighbors. The cause for the positive Vi test in the other person has not yet been explained. The one stool specimen

examined from her was negative for *Eberthella typhosa*. Stool cultures were also negative on the 8 persons failing to show Vi agglutinins.

#### SUMMARY

In a "typical county" in which typhoid fever had been occurring for many years, Vi agglutination served as a useful screen test by which to narrow down the field for stool examinations and ultimate carrier detection. Seven endemic areas were investigated, and Vi agglutinations performed on the blood of 100 suspected carriers and contacts. Eight persons showed positive Vi agglutination and 4 of these, or 50 per cent, were proved to be carriers by isolation of the typhoid bacillus in stool cultures. The reason for the positive Vi reactions in the blood of the other 4 persons has not been explained. Stool cultures were negative from all persons with negative Vi test in this group. The examination of stool specimens without previous laboratory selection or the application of the H and O reaction as a screen test have proved more laborious and considerably less effective methods when used under the same conditions for the detection of carriers in these areas. Brief descriptions are given of the four epidemiological investigations in which carriers were discovered.

#### REFERENCES

1. Felix, A. Detection of Chronic Typhoid Carriers by Agglutination Tests. *Lancet*, ii:738, 1938.
2. Bhatnager, S. S. Vi Agglutination in the Diagnosis of Typhoid Fever and the Carrier Condition. *Brit. M. J.*, 2:1195, 1938.
3. Elliot, C. P. The Vi Agglutination Test as an Aid in the Detection of Chronic Typhoid Carriers. *Am. J. Hyg.*, 31:6 (Jan.), 1940.

# The Ohio River Pollution Survey, in Relation to Pollution Problems in the Lower Ohio River Basin \*

E. S. TISDALE

*Sanitary Engineer (R), U. S. Public Health Service, Cincinnati, Ohio*

PUBLIC health and stream sanitation are profoundly influenced by the strenuous times in which we are living today. The entire world is shrinking in reference to time and place locations. At the dedication of the National Institute of Health at Bethesda, Md., on October 31, 1940, President Roosevelt graphically told how the jungle yellow fever of Africa was only two days away from the United States by reason of modern transportation by airplane. Likewise our concepts of large drainage basins like that of the Ohio River are changing. It is as though we were taken to a high altitude in an airplane and, looking down, could see the entire basin in one panoramic view.

It is this total concept of river basins in respect to major water uses and stream sanitation which is one of the unique aspects of the Ohio River Pollution Survey. For the past 2 years this Ohio Basin has been looked at in a way comparable to that of the aviator, except that the glasses through which the Ohio and its tributaries were being seen were those attuned to and focused in such a way as to report defects in

stream sanitation throughout the drainage basin.

## PURPOSE OF JOINT SURVEY

Congress ordered that the Corps of Engineers, U. S. Army, should undertake this comprehensive pollution study. By agreement, the U. S. Public Health Service and the U. S. Army Engineers have undertaken it as a joint program, utilizing the personnel, equipment, and resources of each agency to the best advantage. It has resulted in many federal and state departments concerned with water conservation and public health pooling their resources to develop a practical attack on stream pollution control in the Ohio Basin, covering over 200,000 square miles, and affecting 17½ million people who live and work in this highly industrialized area.

The headquarters stations of the Ohio River Pollution Survey are at Cincinnati, Ohio, in the Ohio River Army Engineer Division Office, and at the U. S. Public Health Service Stations. All stream flow data come to Cincinnati from the other Army Engineer District offices at Pittsburgh, Huntington, Cincinnati, Louisville, and Nashville. The laboratory headquarters point is the Stream Pollution Investi-

\* Read before the Southern Branch American Public Health Association at the Ninth Annual Meeting in Louisville, Ky., November 12, 1940.



gations Station, while the center for the collection of "sources of pollution" data is the Office of Stream Sanitation, U. S. Public Health Service.

#### FIELD STATIONS DEVELOP SOURCES OF POLLUTION

The traditional and successful relationship developed by the Service with the states for working together in the public health field was utilized in developing the basic information on stream sanitation. In 1940, this program of work functioned through 11 field stations at state health department offices in: Buffalo, N. Y.; Greensburg, Pa.; Meadville, Pa.; Pittsburgh, Pa.; Charleston, W. Va.; Columbus, Ohio; Louisville, Ky.; Indianapolis, Ind.; Springfield, Ill.; and Nashville, Tenn.; and with the T.V.A. at Wilson Dam, Ala. During 1939 and 1940, the field engineers completed detailed reports on 4,757 public water supplies, sewage disposal works, and industrial waste disposal systems.

These data are important in making a loading chart for each stream in the Ohio Basin, in calculating the effect of pollution upon public water supplies, oxygen relationships, and the important water uses of the stream, and in outlining the installation and operating cost of practical remedial works.

#### MEASURING WATER QUALITY IN STREAMS

The floating laboratory boat "Kiski," and 4 motor boats are covering the main Ohio River. The "Kiski" is now based at East Liverpool, Ohio, having worked at Marietta, Ohio, from April to September, 1940. During 1939, while the middle-third of the basin was being studied, the "Kiski" was based at Ashland, Ky.

Six auto-trailer units working on a time table schedule are covering the tributary streams in Kentucky, Pennsylvania, Indiana, and Illinois. Selected biochemical, bacteriological and chem-

ical tests are run on the water samples taken at carefully determined points above and below pollution foci. Approximately 100,000 analytical determinations have been completed up to October 1, 1940.

#### STREAM FLOWS AND WATER STORAGE

The stream flow measurements on the Ohio River and its tributary streams are being handled by the U. S. Army Engineers. Decades of studies and work relating to navigation and flood control have made available in their district and Division Offices a tremendous fund of information. The amount of water available at a given point where a sample is collected bears definitely on the question of necessary remedial measures. A comprehensive system of flood control reservoirs is now under construction by the Army Engineers on the tributaries of the Ohio, and it is possible that the regulation of water flow from some of these storage basins may play an important part in the stream pollution control program.

#### POLLUTION INCREASE AFFECTS PUBLIC WATER SUPPLIES

Public health officials in the southern states which border the lower Ohio River may be interested in the trends which our long range regional viewpoint is developing.

First of all, what is the population growth trend? In 1890, the population in the Ohio Basin was 11 millions, by 1915 it had risen to 15 millions, and now in 1940, when we have reached practically the upper limit in the perfection of water purification equipment, the population has attained approximately 19 millions.

Industrial activity is rapidly increasing, particularly in several of the tributary drainage basins in the southern states. Along the main Ohio River, water supply troubles, with their attendant effect upon the public health,

have multiplied during the past decade, due to the heavy burden of untreated sewage and industrial wastes discharged into the stream.

Periodically, heavy waves of pollution have surged down the Ohio, similar to those recorded in the Niagara River, when ice gorges broke, releasing heavy slugs of polluted water, which caused intestinal outbreaks in cities below using the Niagara River as a source of drinking water.

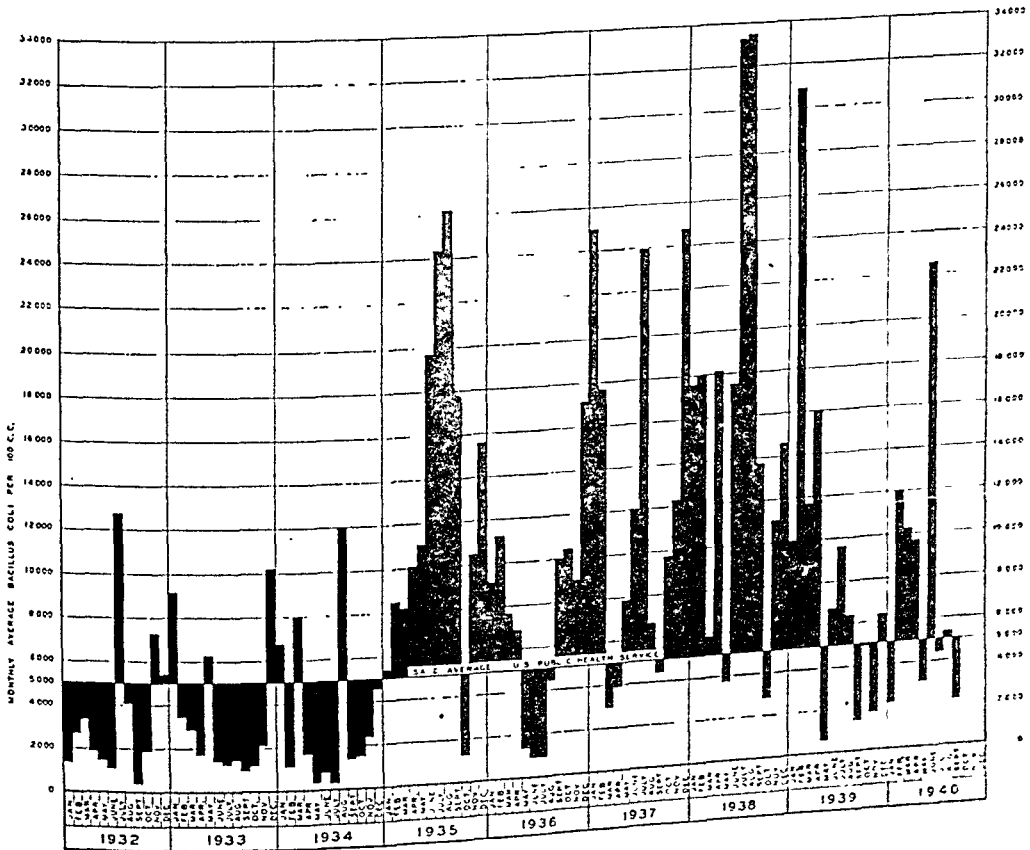
In the Ohio Basin, following several severe droughts in the decade 1930-1940, heavy rains brought about rises in the Ohio which quickly carried the accumulated pollution load to public water supply intakes causing serious taste and odor troubles. Also there were well defined gastroenteritis out-

breaks in cities along the Ohio River in this period which were attributed to public drinking water supplies derived from water filtration plants unable to cope with the excessive pollution.

In this connection, it is significant to recall the Ohio River studies of 1928 by Dr. M. V. Veldee of the U. S. Public Health Service. He showed the tremendous decrease in typhoid fever death rates in cities along the stream, when safe public water supplies were substituted for unsafe ones in the period 1910 to 1928.

Let us bear in mind that the danger is constantly present in the raw river water and it is only the protecting wall of the efficiently operated water filtration plant which holds back the menace of water-borne intestinal diseases.

INCREASE IN POLLUTION - OHIO RIVER  
CINCINNATI WATER INTAKE



The story of what is going on in the main river in the central and southern portions of the Ohio is told by the attached chart which depicts the increasing pollution load at the water works intake at Cincinnati, Ohio. Taking Senior Sanitary Engineer H. W. Streeter's figure of 5,000 *B. coli* per 100 cc. as the safe loading for modern water purification systems, it is evident that the solid blocked-in area above this 5,000 horizontal line on the chart represents the increasing load of pollution above the safety limit during the past decade. The factor of safety is proportionately reduced.

During 1939, a drought year, another warning was sounded at Louisville and also at Paducah, Ky., both of which cities use the Ohio as sources of public water supply. Due to the extraordinary development of algae in the river water at both these points, nauseating tastes and odors developed in the public water supplies. As high as 800 lbs. of activated carbon daily were fed into the water as it passed through the purification system at Paducah in an effort to eradicate the nauseating taste. At Louisville the State Health Commissioner Dr. A. T. McCormack, an indefatigable worker for regional and national stream pollution control machinery, reported that many people implored help from the State Health Department over the telephone stating that they were being made ill by the drinking water.

#### INDUSTRIAL WASTE STUDIES IN TENNESSEE, CUMBERLAND AND KANAWHA BASINS

The Tennessee Valley Authority has been carrying on, for 3 years, a comprehensive stream sanitation program with the State Health Departments in the 7 states in the Tennessee Basin. Industrial growth in the Tennessee Valley area has been rapid. New types of industrial wastes have created new

problems of waste treatment. Field engineers of the Public Health Service and the Tennessee Valley Authority have combined forces to carry on detailed field and laboratory studies to determine the population equivalents of these wastes, and measure their effects upon the tributary streams of the Tennessee River.

The rapid growth of the chemical industry in the Kanawha River Basin, near Charleston, W. Va., has resulted in taste producing industrial wastes entering the streams. Coöperative studies in the field during the winter of 1939-1940, between the State Health Department, the industries, and the trailer laboratory staff of the Ohio River Pollution Survey, have produced definite results in determining the location and cause of detrimental wastes, and securing remedial action.

The Cumberland Basin, particularly in the Nashville area, has undergone joint intensive investigation by the state and federal engineers with a view to determining exactly the pollution load on the stream and prescribing a definite remedial program.

As will be indicated later, the tremendous strides forward in sewage treatment in the Ohio Basin have not been matched in the disposal of industrial wastes. Therefore, one of the major tasks of the Cincinnati staff has been to assemble and summarize available information on the strength, magnitude, and treatment of industrial wastes. During the past 2 years 10 preliminary waste guides have been formulated dealing with wastes in the following industries:

- |                 |                   |
|-----------------|-------------------|
| 1. Brewing      | 6. Tomato Cannery |
| 2. Tannery      | 7. Meat           |
| 3. Paper        | 8. Milk           |
| 4. Paper Pulp   | 9. Oil            |
| 5. Corn Cannery | 10. Coke          |

#### PROGRESS IN SEWAGE TREATMENT IN LOWER OHIO BASIN

Drainage from the Wabash, Green,

Cumberland, and Tennessee basins is discharged into the lower Ohio River. Progress in the installation of sewage treatment plants on certain tributaries has been outstanding. The progress in cleaning up certain streams by the construction and operation of modern sewage treatment plants has been due largely to an awakening public opinion in favor of water conservation and to stimulation by federal funds available for remedial works through PWA and WPA.

In certain states where definite state legislation has been passed for the investigation of pollution and the entering of orders, when necessary, to abate detrimental stream pollution, the progress in cleaning up tributaries appears to be rapid.

Since it is easier to prevent stream pollution than to cure it, after a large industry or city has established the practice of discharging detrimental wastes, it would appear to be wise for states which have not already done so to begin to set up the necessary machinery to cope with stream pollution in this rapidly developing section of the Ohio Basin south of the Ohio River.

#### EVOLUTION OF POLLUTION CONTROL BY INTERSTATE SANITATION COMMISSION

The state health authorities in the 8 states along the main Ohio have recognized for years that definite administrative machinery was necessary to control interstate pollution. The federal government had no power to do the work, neither had any one state.

Hence, in 1935, after the serious water supply dangers of the drought years, the State of Ohio, aided by forward looking Cincinnati citizens, alarmed over the water supply situation, assumed the leadership toward setting up a regional water sanitation compact of states along the main river.

The Ohio River Valley Water Sanitation Compact was negotiated from

1935 to 1937 by authorized representatives of 8 states. After reaching an agreement on the compact, identical legislation was submitted to and passed, in 1939 and 1940, by 6 of the 8 states—Ohio, West Virginia, New York, Kentucky, Indiana, and Illinois. The first and second named states inserted provisos for the compact to become effective only when upstream states had passed similar legislation.

The present Congress passed the necessary federal legislation during the summer of 1940, approving the compact which provided for it to become effective, as soon as one more state acted favorably. The interstate Water Sanitation Commission would be made up of 3 representatives from the federal government and 3 appointees from each state. Standards for waste disposal and provision for the enforcement of orders are set up in the Compact, a majority vote of all members and also of members from each state being necessary for the entering of orders for remedial measures.

Kentucky, Indiana, and Tennessee would benefit materially if this compact could become effective in 1941, and even greater benefits would accrue to states in the upper part of the Ohio Basin.

#### SUMMARY

1. Public health considerations, the water conservation movement considering drainage basins as a whole, population growth, and industrial expansion, have made it desirable to ascertain the sources and effects of stream pollution in the industrialized Ohio Basin and develop a practical regional plan for pollution control.

2. For 2 years, a joint program, utilizing the resources of the Army Engineer staff in the Ohio Basin and the U. S. Public Health Service laboratories and field stations in the basin, has been actively in progress and the report containing findings and recommendations will be completed during 1941.

3. Public health, public and industrial water supplies, navigation, aquatic life, and recreation are affected by increasing sewage and

industrial pollution in the Ohio Basin.

4. During the period of the Ohio River Pollution Survey, 1938-1940, 6 states have acted in concert toward the development of a compact which provides regional administrative machinery to control interstate pollution in the Ohio Basin.

5. Marked progress has been made in re-

ducing sewage pollution in streams in the lower Ohio Basin through the construction and operation of modern sewage treatment plants. The final report of the Ohio River Pollution Survey will point out the necessary remedial measures and their costs on each of the 22 large watersheds which make up the Ohio Basin.

# The Epidemiology of Rheumatic Fever\*

JOHN R. PAUL, M.D.

*Section of Preventive Medicine, Yale University School of Medicine,  
New Haven, Conn.*

FOR some years reasons have been obvious for promoting the public health aspects of rheumatic fever, a disease which may be classed as our third most common chronic infection (after tuberculosis and syphilis). But in spite of the obvious need, there have also been reasons why relatively little public health work has been done on rheumatic fever in this country, and not the least among them is the fact that it has not been at all clear what should be done. Rheumatic fever is not a disease which is going to be brought under control easily. First of all its etiology is obscure, for in spite of the plain fact that this disease has something to do with hemolytic streptococcus infections, the real nature of rheumatic fever is still poorly understood. Second, there are few, if any, tests which are yet available for diagnosis like the tuberculin test or the Wassermann test. In their absence, the practitioner must resort largely to his wits and to his stethoscope. There is nothing specific, nothing as yet beyond the experimental stage, which can be recommended as a means of prevention. All of these things tend to make the public health officer regard rheumatic fever with some

dismay. The situation is not unlike that which existed with tuberculosis in its pre-bacteriologic, pre-tuberculin and pre-x-ray days.

But if one cannot control a disease he can at least begin with observations on its prevalence, and it is with this point of view in mind that this review of the epidemiology of rheumatic fever has been prepared. In other words, it is concerned with an analysis of the circumstances under which rheumatic fever seems to flourish; where it is most commonly found; and where it is least commonly found.

## GENERAL PREVALENCE

Rheumatic fever is not a reportable disease except in a few countries and small communities. It is not easy therefore to compare its actual incidence with that of tuberculosis or pneumonia. But from other methods one finds that (in certain parts of the world, at least) rheumatic fever ranks among our most important chronic infectious diseases. This information can be readily obtained from: (a) analyses of hospital admission rates; (b) mortality rates for rheumatic heart disease; and (c) estimates of the clinical prevalence of rheumatic heart disease among school children. The hospital rates were first compiled on a national (or continental) scale by the Seegals,<sup>1</sup> who collected data

\* Read before the Epidemiology Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

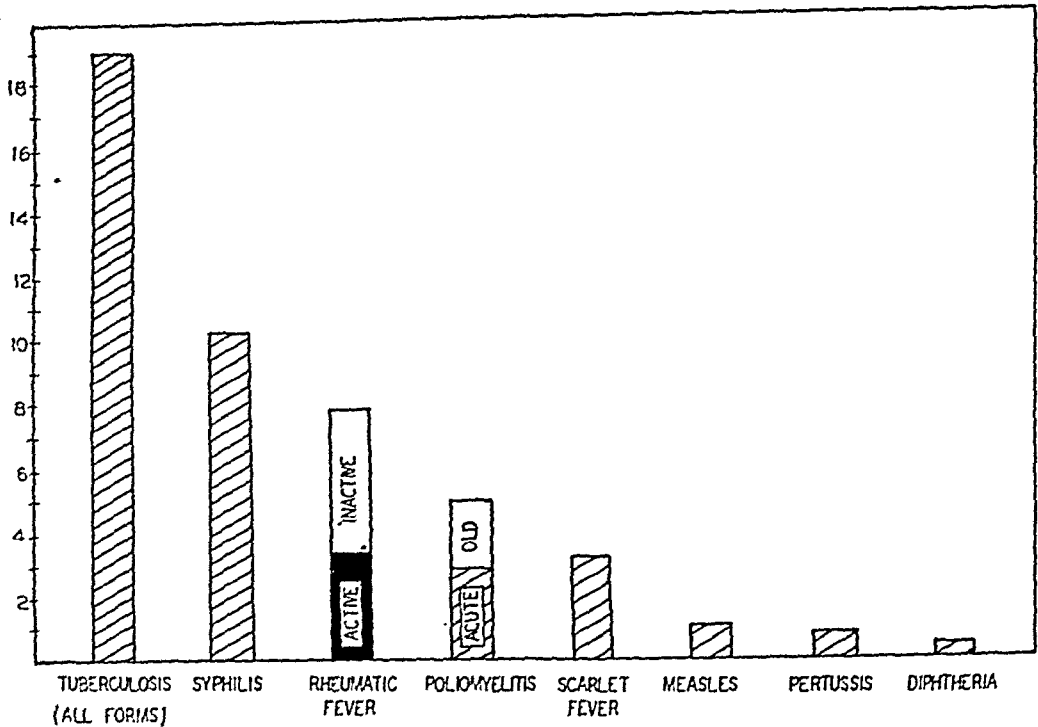


FIGURE 1—Data from New Haven Hospital showing the ratio whereby rheumatic fever patients were admitted to the medical service in contrast to those of patients suffering from other chronic and acute infectious diseases.

from widely separated areas in the United States and Canada and found them to range from 0.1 to 5.5 per cent. A more recent nation-wide survey of this type has been conducted by Hedley<sup>2</sup> of the U. S. Public Health Service; and we have also just completed two local surveys, in the city of New Haven,<sup>3</sup> and the State of Connecticut.<sup>4</sup> These studies indicate that patients with rheumatic fever, chorea, and rheumatic heart disease represent about 2.5 per cent of the total number of patients admitted to the medical services of general hospitals in this country; and, according to Hedley,<sup>2</sup> to the children's hospitals at a rate of 5.6 per cent. The admission rates do not indicate prevalence *per se*, but they measure the extent to which local physicians use the hospital for rheumatic fever. In New Haven (and probably this is true of many other cities in the same general latitude) we found that this index places rheumatic fever in a

position of importance ahead of all other chronic infectious diseases with the exception of tuberculosis and syphilis (see Figure 1 covering period of 1929 to 1939).

From mortality statistics indirect data on prevalence may be derived, for the disease is essentially one which produces a high degree of chronic morbidity, and delayed rather than acute mortality (in fact, death is said to occur in less than 1 per cent of the so-called acute cases). But the prevalence of rheumatic heart disease is nonetheless an expression of the prevalence of rheumatic fever, and careful analyses of deaths from this cause are illuminating. Hedley<sup>2a</sup> found that, for the city of Philadelphia in 1936, the total mortality from rheumatic heart disease was about 25-30 per 100,000, and among the infectious diseases this was again exceeded as a cause of death only by tuberculosis, lobar pneumonia, and syphilis. Subsequently Hedley<sup>2b</sup>

pointed out that, as nearly all the deaths from heart disease among persons 5-24 years of age are due to rheumatic heart disease, the use of the total cardiac mortality rates during this age period is of value in measuring trends in the mortality from rheumatic heart disease.

But the best available measures of the prevalence of rheumatic heart disease have come from careful surveys of school children to determine the rate at which rheumatic heart disease is present among them. Results of large surveys in cities such as Boston,<sup>6</sup> New York,<sup>7</sup> and Philadelphia,<sup>8</sup> show that between 0.6 and 1.6 per cent of these children have cardiac lesions, of which 80 to 90 per cent are probably rheumatic in origin.

In smaller surveys,<sup>9, 10, 4</sup> in which the cardiac work has been done with particular attention, these school children

rates among the age group of 12-14 have been found to run as high as 4 per cent. This is another indication of the great prevalence of this disease in some areas.

#### BACTERIAL INCITANT

No attempt will be made to review the enormous literature which deals with the search for a specific bacterial incitant in rheumatic fever. More attention has been paid to streptococci than to other types of bacteria, and most workers investigating the cause of rheumatic fever seem to have been forced at some time to a consideration of the part which these organisms may play. The association between *Streptococcus hemolyticus* infections of the upper respiratory passages and rheumatic fever is very strong, for a high percentage of acute attacks of the latter disease seem to be initiated by such in-

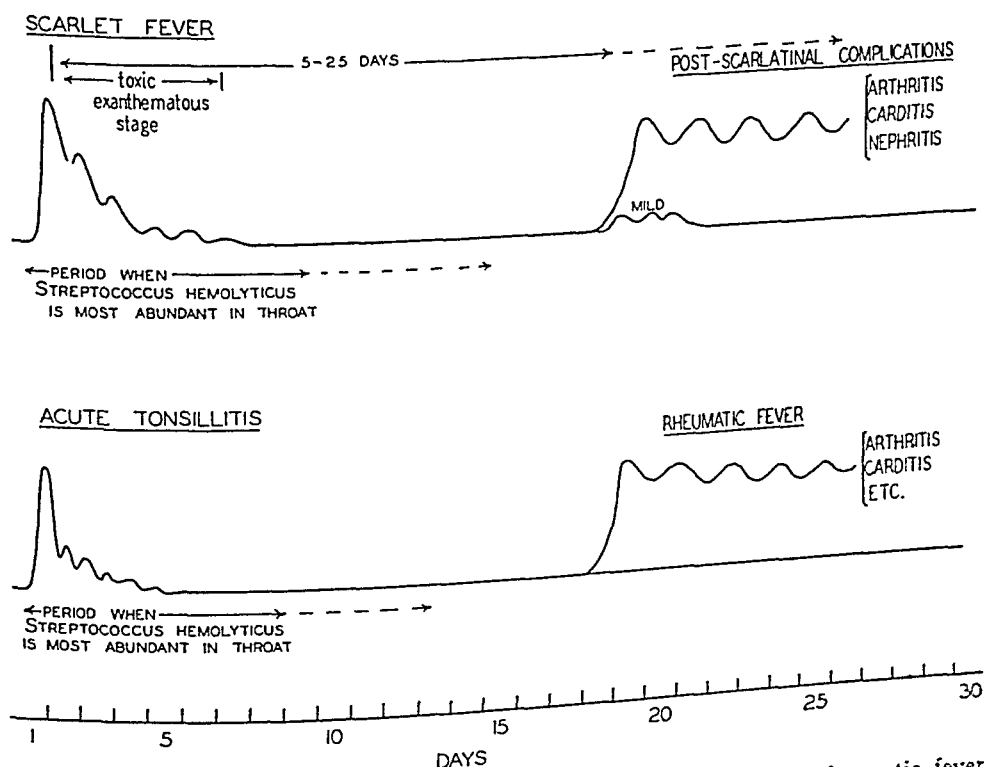


FIGURE 2—For an appreciation of the manner in which an attack of rheumatic fever is often precipitated or preceded by an upper respiratory infection we can compare this situation with the clinical events which may follow scarlet fever—viz., the non-suppurative complications of scarlet fever.



fections (Figure 2). Nevertheless, whether rheumatic fever represents a peculiar immunological response to infections with the streptococcus, or whether streptococcus infections merely activate another condition (which may be latent in the host), or whether patients with rheumatic fever are particularly susceptible to infections by the streptococcus, are unanswered questions. It would indeed seem that there must be certain important factors standing between the host and parasite, so to speak. These factors are unknown at present, and resist definition, although Coburn,<sup>11</sup> in a recent excellent review on this subject, has spoken of them as, "the faulty disposal of *Streptococcus hemolyticus* within the rheumatic or potentially rheumatic patient." Whatever the ultimate nature of these factors may prove to be, it would seem that the nature of susceptibility is one of the greatest riddles in the pathogenesis of this disease.

#### PREDISPOSING CAUSES—GEOGRAPHIC AND CLIMATOLOGIC

Mention has been made of the fact that, although rheumatic fever is widespread throughout the world, its prevalence is influenced by climatic conditions. The extent to which this is true, however, has been discussed much more often than it has been measured. Widespread differences in clinical concepts about this disease which exist in different places, difficulties in clinical diagnosis and the absence of specific diagnostic tests have made it hard to

determine its prevalence with accuracy in any given locality, much less to compare its prevalence in several localities. Despite the lack of accurate data, however, there is general agreement that the disease is common and severe in temperate zones, that it is less common in warmer and subtropical climates, and that it is rare in the tropics.<sup>12</sup> This conclusion has been reached via all of the three methods which have been mentioned as of use in determining the local prevalence and severity of rheumatic fever. Hospital admission statistics from North America record a higher incidence of the disease in the north-middle Atlantic states and Canada (45°–50° latitudes), as opposed to the southern states.<sup>13, 1</sup> Parallel to this decrease in rheumatic fever in the South, the death rates from heart disease are found to be appreciably lower among white persons 5–24 years of age in most southern as compared with northern cities.<sup>5b</sup> Furthermore, in a recent study of the prevalence of rheumatic carditis among Indian school children in the West, it was found to be almost 10 times as prevalent in the Northwest as in the Southwest.<sup>10</sup> These data appear in Table 1. There have been many attempts to explain this situation, but apart from the fact that the disease seems to flourish in cold weather, and damp weather, and where people are crowded within doors, there are no explanations for this phenomenon.

It is possible that the increased prevalence of upper respiratory infec-

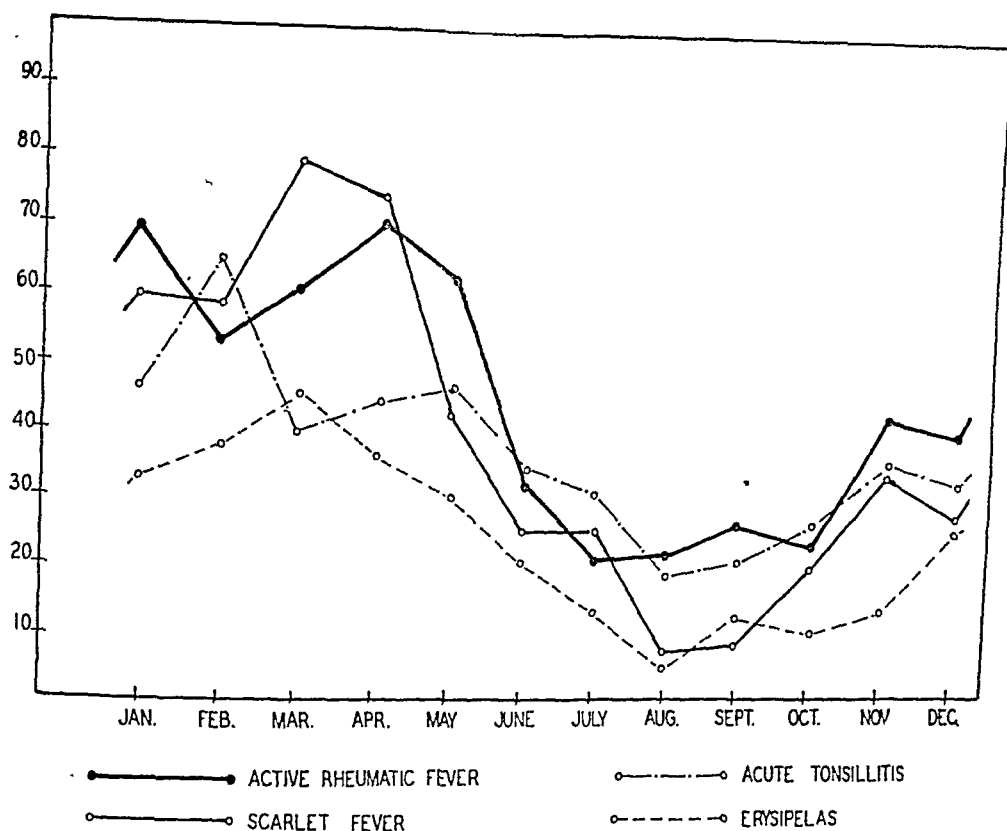


FIGURE 3—The monthly incidence of cases of active rheumatic fever compared to scarlet fever, acute tonsillitis, and erysipelas. Data taken from the New Haven Hospital, covering the years 1929 through 1938.

tions (particularly those due to the *Streptococcus hemolyticus*) during the winter months is entirely responsible for the increased prevalence of rheumatic fever during the winter. Among the first to call attention to this correlation from a statistical standpoint were Atwater<sup>14</sup> and Rosenau,<sup>15</sup> who pointed out that a good year for streptococcus disease was a good year for rheumatic fever. Certainly the seasonal and (epidemiological) association between these two infections is clear enough, and has been used as evidence of a common etiology. The coincidental occurrence of epidemics of the two diseases for instance has been recognized in England by Schlesinger,<sup>16</sup> Sheldon,<sup>17</sup> Collis,<sup>18</sup> and by Glover and Griffith,<sup>19</sup> and in this country in particular by Coburn and Pauli,<sup>20</sup> and also by Zuger,<sup>21</sup> and in Denmark by Madsen.<sup>22</sup> The last investigator pointed

out that the seasonal peak for rheumatic fever lags some weeks behind that of scarlet fever, and tonsillitis. This we have also had occasion to observe in New Haven (see Figure 3), and it seems reasonable enough when one considers the clinical behavior of this disease and how it appears after an interval of 1 to 3 weeks following an attack of acute tonsillitis. In brief then, the explanation for the increased prevalence of rheumatic fever during the winter and early spring months may not be clear, but the situation at least resembles that which prevails in respiratory infectious diseases, which also find their highest incidence during the colder months, and under situations which promote crowding within doors.

#### SOCIAL AND LIVING CONDITIONS

From the information which has just been reviewed we find some justification

for designating rheumatic fever as a "crowd disease." It is definitely more prevalent among urban than rural populations. This has long been the contention in England,<sup>23</sup> and there is evidence that it is true in this country, for Hedley's mortality statistics indicate that the rates in cities with 100,000 population and over are significantly higher than those from the geographical sections in which the cities were located.<sup>24</sup> It has also been more or less borne out by the results of a recent survey<sup>4</sup> on the state-wide prevalence of heart disease among school children in Connecticut, where rheumatic heart disease was found to be more common in the factory cities than in the semi-industrial and rural towns.

It has been said in England also that the disease has a particularly high incidence among river front dwellings in industrial towns,<sup>24</sup> and there may be some confirmation of this finding in this country, although here again attempts to analyze this situation have met with stubborn resistance. At least, however, the areas in which the disease has reached a very high prevalence within the City of New Haven have not only been damp, but actually wet.<sup>25</sup> Whatever the relationships between damp housing conditions and the incidence of rheumatic fever may be, however, it must be an indirect one. It is probably related to the general fact that certain poor urban living conditions, particularly crowding, promote certain types of ill health, and that such conditions may often be dependent on poverty.<sup>26</sup> Rheumatic heart disease does find a higher prevalence among poorer people than among the better-to-do,<sup>26, 27</sup> but poverty alone is not an adequate cause of rheumatic fever. Intimately related to poverty are the problems of malnutrition, crowding, uncleanness, poor ventilation, and the presence of vermin; and somewhere among these remediable conditions

someone will eventually find the reason why rheumatic fever flourishes in the slums. Possibly the situation is analogous to that seen in tuberculosis, where crowding renders conditions favorable for the spread and maintenance of these infections.<sup>26</sup> Certainly there are analogies between the distribution of rheumatic fever within the City of New Haven and the distribution of tuberculosis.

#### RACIAL SUSCEPTIBILITY

Much has been written about the types of individuals who are particularly prone to acquire rheumatic fever, but there is no agreement as to what these types are. In like manner there appears to be little evidence that any particular race is especially susceptible to rheumatic fever, with one notable exception—the Negro race. This is based on Hedley's observation<sup>24</sup> that the death rates from heart disease among young colored persons are higher than among the young whites, both in the North and the South. The susceptibility seems to be one of vulnerability to the ravages of rheumatic fever, rather than to an increased tendency to acquire it.

#### HEREDITARY AND FAMILIAL CONDITIONS

Familial tendencies or diatheses may play an important part in the pathogenesis of rheumatic fever. In other words, rheumatic fever is definitely a family disease. This is based upon the frequency with which more than one member of a family may be attacked, and the fact that, in families in which the parents have suffered from rheumatic fever, the prevalence of the disease may be more than twice as high as in non-rheumatic families. In fact, in so-called rheumatic families 8 to 10 per cent of exposed persons are infected, as against 3 per cent of control families. Forty years ago Cheadle<sup>28</sup> said, "The tendency to rheumatism is transmitted

as strongly as the tendency to gout"; and this practically sums up the question today. But, much new work<sup>29</sup> has been done on this subject. Wilson and Schweitzer<sup>30</sup> in New York City have presented the view that hereditary susceptibility to rheumatic fever seems to determine the familial incidence of this disease. Their studies indicate that there is a hereditary factor transmitted as a single autosomal recessive gene, distributed among the population which makes the bearer susceptible to this disease. Gauld and Read<sup>31</sup> in Baltimore have also confirmed the finding that the children of rheumatic parents had higher attack rates than the children of non-rheumatic parents.

It actually comes down to the question as to whether the high prevalence of this disease in some families is wholly hereditary, or is wholly domiciliary, or is a combination of both. That domiciliary factors must be considered, to some extent at least, is shown by the effect of living conditions on the prevalence of this disease, which has already been discussed. Certainly environmental factors play a part in *timing* the acute episodes of rheumatic fever within a family. As for example we have the familial outbreaks of "rheumatism" following close upon the heels of familial epidemics of streptococcus infection, notably those of scarlet fever.<sup>32b</sup> In review then it seems that we have another analogy with tuberculosis and that the familial situation is one in which both hereditary and environmental factors must play their share.

But apart from the academic significance of familial epidemics of rheumatic fever, one practical lesson to be learned from this approach is that any control program in this disease may profitably center upon the rheumatic family. In accepting this approach we are following a lead already established by workers with the other two major chronic infectious diseases which beset

our civilization in this part of the world, namely, tuberculosis and syphilis. In these diseases the family approach exists as an opening wedge in the field of prevention. Private physicians, hospitals, and dispensaries will probably accomplish more at present in the way of prevention by taking advantage of this fact than by any other means now at our disposal. The mechanism for dealing with the rheumatic family has not been standardized, but if one child, or even one parent in a family, is found to have the active disease it is fair to assume that the conditions which favor the presence of this illness (whether they are hereditary or environmental) are present in that household; and the least that one can do is to begin by examining the other members of the family, and the general household situation.

#### SUMMARY

Rheumatic fever is a common and serious infectious disease in which neither the pathogenesis nor the complete clinical picture has been established. It is a "crowd disease" and a disease that often follows close upon the heels of a *Streptococcus hemolyticus* infection; it is more common in temperate climates; it finds a high incidence among the poorer classes of urban and industrial populations; it is particularly fatal to the Negro race; it is a "family disease" with a familial incidence closely resembling that of tuberculosis; and from an epidemiological point of view and from a public health point of view there are several other features which are analogous to tuberculosis.

#### REFERENCES

1. Seegal, D., and Seegal, E. B. C. *J.A.M.A.*, 89:11, 1927. Seegal, D., Seegal, E. B. C., and Jost, E. L. *Am. J. M. Sc.*, 190:383, 1935.
2. Hedley, O. F. Personal communication to author.
3. Farquhar, L. R., and Paul, J. R. *Pub. Health Rep.*, 55:1903, 1940.
4. Paul, J. R., and Deutsch, J. V. Rheumatic

Fever in Connecticut. Connecticut State Dept. Health, Hartford, Conn., 1941.

5. Hedley, O. F. (a) *Pub. Health Rep.*, 52: 1907, 1937; (b) *Pub. Health Rep.*, 54:2271, 1939.

6. A Cardiac Survey of Children in Boston Public Schools. *Nation's Health*, 9, No. 12, 1927.

7. Bainton, J. H. *A.J.P.H.*, 18:1252, 1928; Meyers, J. *A.J.P.H.*, 21:615, 1931.

8. Cahan, J. M. *J.A.M.A.*, 92:1576, 1929.

9. Paul, J. R., Harrison, E. R., Salinger, R., and De Forest, G. K. *Am. J. M. Sc.*, 188:301, 1934.

10. Paul, J. R., and Dixon, G. L. *J.A.M.A.*, 108: 2096, 1937.

11. Coburn, A. F. *Tr. & Studies Coll. Physicians Phila.*, 4th series, 8:91, 1940.

12. Literature on this subject has been discussed and summarized by (a) Nichol, E. S. *J. Lab. & Clin. Med.*, 21:588, 1936; (b) Coburn, A. F. *The Factor of Infection in the Rheumatic State*, Williams & Wilkins, 1931; (c) Paul, J. R. *The Epidemiology of Rheumatic Fever*, New York, Metropolitan Life Insurance Company Press, 1930.

13. Harrison, T. R., and Levine, S. A. *South. M. J.*, 17:914, 1924.

14. Atwater, R. M. *Am. J. Hyg.*, 7:343, 1927.

15. Rosenau, M. J. *Tr. A. Am. Physicians*, 43: 171, 1928.

16. Schlesinger, B. *Arch. Dis. Childhood*, 5:411, 1930.

17. Sheldon, W. *Lancet*, 1:1337, 1931.

18. Collis, W. R. F. *Lancet*, 1:1341, 1931.

19. Glover, J. A., and Griffith, F. *Brit. M. J.*, 2 521, 1931.

20. Coburn, A. F., and Pauli, R. H. *J. Exper. Med.*, 56:609, 1932, and many subsequent papers by Coburn.

21. Zuger, B. *Am. J. Hyg.*, 21:588, 1935.

22. Madsen, T. *The Abraham Flexner Lectures*. Series No. 5, Chap. 4, Williams & Wilkins, 1937.

23. Miller, R. (Suppl.) *Brit. M. J.*, 2:5 (July 3), 1926.

24. Thomson, A. P. *Birmingham M. Rev.*, 1, No. 7, 1926.

25. Paul, J. R. *Tr. A. Am. Physicians*, 55:290, 1940.

26. Britten, R. H., Brown, J. E., and Altman, I. *Milbank Memorial Fund Quart.*, 18:89, 1940.

27. Paul, J. R., and Leddy, P. *Am. J. M. Sc.*, 184:597, 1932.

28. Cheadle, W. B. *Harveian Lectures on the Rheumatism of Childhood*. Smith, Elder & Co., London, 1900.

29. For discussion of literature see Editorial—Familial Nature of Rheumatic Diseases. *J.A.M.A.*, 111:534, 1938.

30. Wilson, M. G., and Schweitzer, M. D. *J. Clin. Investigation*, 16:555, 1937. See also Wilson, M. G. *Rheumatic Fever*, Chap. 3, The Commonwealth Fund, Oxford University Press, New York, 1940.

31. Gauld, R. L., and Read, F. E. M. *J. Clin. Investigation*, 19:393, 1940.

32. (a) Paul, J. R., and Salinger, R. *J. Clin. Investigation*, 10:33, 1931; (b) Paul, J. R., Salinger, R., and Zuger, B. *J. Clin. Investigation*, 13:503, 1934.

# Study of Dust Conditions in the Tri-State Mining District of Oklahoma, Kansas, and Missouri\*

CHARLES C. DILLS, F.A.P.H.A.

*Industrial Hygiene Engineer, State Board of Health, Jefferson City, Mo.*

THE Picher District of the Tri-State zinc and lead mining field is one of the most important sources of zinc in the world. It is an area of about 18 square miles with Picher, Okla., as its centers. Some additional mining is done in proximity to Waco, in both Kansas and Missouri, with additional mines operating near Joplin, Stark City, Wentworth, and Aurora in the latter state. The relative proportions of concentrates produced in Oklahoma, Kansas, and Missouri is 58, 36, and 6 per cent, respectively.

The ore minerals are found intermingled with highly siliceous minerals such as chert and jasperoid. Other gangue minerals include dolomite and calcite, and in some mines, soapstone and cotton rock. As the percentage of sphalerite plus galena varies from 4 to 12, the average being about 6, it is necessary that the operators work on a small profit margin. In general, the working face averages about 88 per cent free silica.

In December, 1937, the Industrial Hygiene Section of the Kansas State Board of Health published a preliminary survey report<sup>1</sup> of the Kansas zinc and lead mines. At that time,

1,469 men were employed in the mines and mills. There were 889, or 61 per cent, employed at the working face and 580, or 39 per cent, away from the working face. Employment in the mines and mills at the present time is comparable to the above figures. Employment would increase with an advance in the price of concentrates, since several mines are not operating which could operate at a higher price.

In this preliminary report, attention was directed to the possibility of a surface dust hazard for those people living in and adjacent to the mining district. A review of the literature indicated no report of silicosis in people whose entire lives had been spent on the surface of the ground away from dusty occupational exposures. Physicians in the area were interviewed and none reported having seen silicosis in individuals other than those employed in the industry.

Since that time complaints have been received by the Kansas State Board of Health from citizens in the mining district to the effect that dust from the slime ponds at the mills and from the roads was impairing their health. The dust at one school was purported to be so bad that a "dust strike" was threatened unless control measures were instituted. These complaints, coupled with a survey report released by the

\* Read at a Joint Session of the Engineering and Industrial Hygiene Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

National Committee for People's Rights<sup>2</sup> and much newspaper publicity together with comments on a national radio program, and moving picture propaganda relative to the unhealthful conditions in the Tri-State District, made it necessary that a study be made of the surface and underground environments in which the miners and others worked and lived. It was decided that the study should include routine collection of dust samples to determine the concentration of dust to which the people living on the surface of the ground were exposed; collection of dust samples in the mines and mills to determine the hazards under which men worked; a sanitary and housing survey of the district; and medical examinations and chest roentgenograms of the individuals exposed to surface dust only, to determine whether or not cases of silicosis were developing in them.

#### SCOPE OF STUDY; SURFACE DUST

The proposed plans for the study of surface dust conditions were discussed with Sanitary Engineer J. J. Bloomfield, U. S. Public Health Service, at the time of his visit to Kansas, October 3, 1939. It was decided that dust sampling stations should be spread across the mining field so that conditions throughout the district could be ascertained. Sampling in this manner would also permit determination of the effect of the wind in dispersing the dust. As the Picher District includes mines in both Kansas and Oklahoma, and since the latter state was planning a similar study, the State Health Officers of the respective states deputized personnel from each department to work in the adjoining state.

A study of the district showed that surface dust originated at two sources; the county and township roads, which are all surfaced with siliceous tailings; and the deposits of sands and slime from the flotation process which have

dried up. The dust sampling stations were located so that a measure of both conditions could be obtained. The sampling stations are indicated in Figure 1, and a description of their location follows:

*Station 1*—Control Station,  $\frac{1}{2}$  mile west from junction of Highways 166 and 69, on Highway 166. Station on south side of road and  $1\frac{1}{4}$  miles north of closest mine.

*Station 2*—Adjacent to N.E.O.R.R. tracks on chert covered township road, 1 mile south and 0.7 miles west of junction of Highways 166 and 69. This station is in proximity to active mines and mills and is close to considerable truck traffic.

*Station 3*—This station is about 0.55 miles west of Station 2, on the north side of the road and adjacent to the N.E.O.R.R. tracks. Active mining and milling take place near this station and it is also close to truck traffic.

*Station 4*—One mile west and 1.4 miles south from the junction of Highways 166 and 69. This station is in the northern part of Wilburton and is subjected primarily to dust resulting from car and truck traffic.

*Station 5*—Treece School. Adjacent to sources of road dust and that caused by the erosion of slime ponds on windy days.

*Station 6*—In City of Treece cater-corner from post office. Subject primarily to dust generated by car and truck traffic. Slime ponds are in the vicinity of the town.

*Station 7*—One-quarter mile north of state line and  $\frac{1}{2}$  mile west of Highway 69, directly north of a tailings pile from a tabling operation. Since the road is covered with chert and carries heavy traffic and because of the proximity of the finely ground sand, this station was selected as representative of the worst possible conditions to be found in the district.

*Station 8*—Cardin (Oklahoma) R. R. Station. Subject to both wind eroded and car and truck traffic dust.

*Station 9*—Control station, 1 mile east of junction of Highways 69 and 66. This station is about 1 mile south of the mining field.

*Station 10*—Three miles east from Highway 69 on state line road and 0.1 mile south, adjacent to N.E.O.R.R. tracks. Indicative primarily of dust due to car and truck traffic.

*Station 11*—Menarch school. Subject to both wind blown dust and that generated by car and truck traffic.

An anemometer and a weather vane were placed at Station 1. As these

instruments were not connected to self-recording devices, wind velocity and its direction were determined each time a dust sample was collected. The results obtained compare favorably with data from surrounding meteorological stations. As the prevailing winds have a south or south-westerly direction for about 10 months of the year, all dust sampling stations were situated on the north side of east-west roads, or the west side of north-south roads. All

stations with the exception of 1, 9, and 7 were selected so that the general average would be representative of conditions in the district. Stations 1 and 9 were control points and 7 was typical of the worst possible conditions, as strong winds cause erosion of great clouds of dust, and car and truck traffic creates excessive dust concentrations.

Since the usual tendency of the wind is to increase in velocity until the middle of the morning, most of the dust

FIGURE 1—Dust Sampling Stations

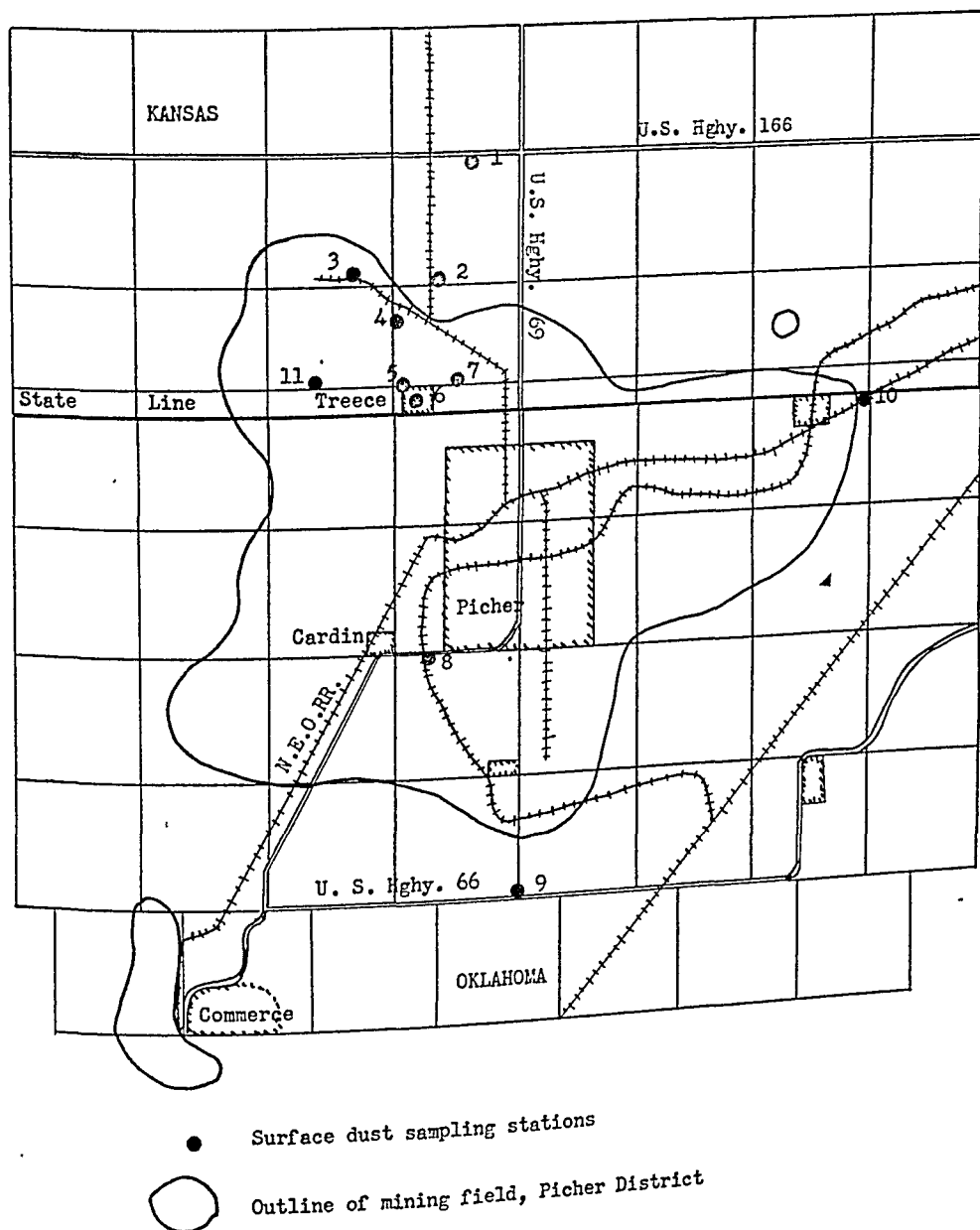




TABLE 1

*Number of Samples, Maximum, Minimum and Average Dust Counts in Millions of Particles per Cubic Foot, Collected at the 11 Surface Sampling Stations and Houses in the Picher District*

Stations →	Dust Counts in Millions of Particles per Cubic Foot of Air										
	1	2	3	4	5	6	7	8	9	10	11 Houses
No. Samples	120	118	143	137	144	116	129	125	121	99	114 51
Maximum	3.7	8.3	12.7	9.2	6.9	7.3	66.0	5.0	5.8	10.3	4.1 3.2
Minimum	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1 0.3
Average	0.3	0.7	0.8	0.8	0.8	0.7	3.3	0.6	0.4	1.5	0.7 0.8

samples were collected during the afternoon so that the counts would be indicative of the worst conditions. Samples were collected at different times of the day and in several houses so that the dust concentrations to which the people were exposed might be determined.

All samples were collected with the M. S. A. midget impinger, approved by the U. S. Bureau of Mines, and the procedure followed in making counts was that recommended by the U. S. Public Health Service.<sup>3</sup>

#### DUST COUNTS AND DISCUSSION OF SURFACE STUDY

Prior to June 30, 1940, 1,366 surface dust samples were collected at the 11 stations indicated in Figure 1. In addition, 51 dust samples were taken in houses. The results of these samples are tabulated (Table 1).

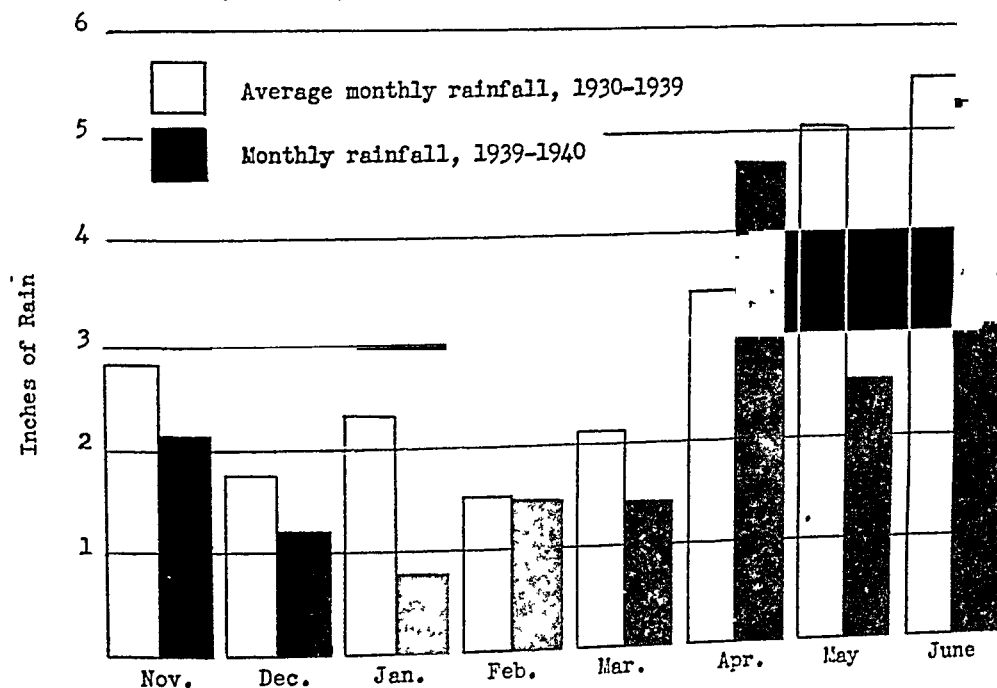
Station 7, as predicted, shows the highest average count with 3.3 million particles per cu. ft. Station 10 is second with an average of 1.5, and Stations 3, 4, and 5 are tied for third with 0.8 million particles per cu. ft. The four latter counts are due primarily to car and truck traffic. Individual counts range from 0.1 to 66.0 million particles per cu. ft. The average dust concentrations for all 11 stations is 1.0 million particles per cu. ft. The average for the outdoor and indoor samples (1.0 and 0.3 million particles per cu. ft. respectively) indicate that they are of the same order of magnitude during warm weather.

The study of "Exposure to Munic-

ipal Dust (Street Cleaners in New York City)" conducted by the U. S. Public Health Service<sup>4</sup> showed average counts for sweepers, varying from 2.0 to 3.3 million particles per cu. ft. in lower Manhattan, and 0.8 to 1.5 million in upper Manhattan. For loading and driving the counts ranged from 2.0 to 9.4 and 1.8 to 8.0 million particles per cu. ft. in lower and upper Manhattan respectively. Lower counts were obtained in Brooklyn except at the unloading at dumps where the count averaged 15.5 million particles per cu. ft. Although the air samples in the New York study were collected with the konimeter instead of the impinger, there is a correlation between the counts since the efficiency of the konimeter in dust concentrations of this magnitude has been found to be 1.5 times that of the impinger.<sup>5</sup>

The dust counts recorded above are about equal to those found in the Tri-State area. The variation in counts in the mining district is greater since strong winds and heavy motor vehicle traffic caused high dust concentrations at some of the stations. Observations indicated that wind velocities in excess of 15 miles per hour were required for dust erosion from the dried sandpiles. The intensity of the dust cloud raised by motor vehicle traffic varies with the moisture in the surface of the road bed, size of the vehicle, speed, etc. The dust counts, excluding Stations 1 and 9, have been analyzed statistically and the results of the study indicate that for 95 per cent of the time the average dust

FIGURE 2—Average Monthly Rainfall in Cherokee County, Kansas, for Periods Indicated



concentration for the 9 stations in the mining district will be less than 2.0 million particles per cu. ft.

#### SURFACE DUST CONTROL

Rainfall is an important dust control measure supplied by nature, for the prevention of dust erosion. Forty-nine years of complete monthly and annual rainfall data are available for Cherokee County, Kans.<sup>6</sup> The average annual rainfall for this period is 41.90 in. During the past 10 years the average has been 36.61 in. The maximum and minimum annual rainfalls during the 49 years are 58.30 and 28.84 in. respectively. The average number of inches of rain for the months included in this study and for the comparable months of the 10 year period, 1930-1939, are shown in Figure 2.

The rainfall for the 8 months during which dust sampling was in progress was below normal. Only 20.23 in. of rain were received during this period as compared with the previous 10 year average of 24.49 for the same months. Excess rainfall over the monthly 10

year average figures occurred in April and June. For the period January 1 to June 30, 1940, reportable rains fell on 49 days, snow 11 days, and traces of rain or snow were reported on 27 additional days. The ground was covered with snow from December 26, 1939, until February.

Some of the mine operators have been sprinkling and oiling the county and township roads used by their trucks. Some dust pollution and complaints were eliminated by getting the mine operators to coöperate in changing their truck routes to less populated centers. Two methods are in use to prevent erosion of dust from the sand-piles; one is to cover them with a few inches of coarse tailings, and the other is to discharge the finely ground slime with the coarse tailings.

#### STUDY OF UNDERGROUND ENVIRONMENT

A description of the operations in the mines is given in the preliminary Industrial Hygiene Survey of the Kansas Zinc and Lead Mines<sup>1</sup> and will not be repeated here. The potentially dusty

operations in the mines mentioned in this report, include shoveling, mechanical loading, loading cans from hoppers, tramping, drilling, blasting, whipping boulders (breaking large boulders with sledge hammers), and roof trimming. Outside of the mines, dumping the ore into bins, as in the derricks (head frames), the jaw and roller crushers and the screening operations in the mills were enumerated as places where dust pollution might occur on the surface.

Included in the dust control measures were: wet drilling, wetting the muck, and working faces before shoveling and drilling began in the morning, sprinkling the haulage ways, and blasting at the end of the working shift. In addition, ventilation (natural and mechanical) was being used as an important aid in dust abatement. This included bringing fresh air into the mines through shafts and drill holes, and forcing air from unpolluted sources in the mines into working areas by means of blowers and sails. Dust control measures in the mills included natural and mechanical ventilation and a liberal use of water. Experimental work was being conducted with water curtains, and jets of air and water mixtures around the mechanical loaders, in an attempt to wet the dust particles and prevent their dispersion. The latter procedure has been discarded since a fog developed which increased the accident hazard of the operation. The air and water jets have been replaced with water sprays designed to discharge a fine mist, and they are producing satisfactory results. Some of the operators have men employed who come on duty at night and spend their entire time sprinkling the haulage ways and muck piles, and washing down the working faces. In the other mines the shovelers, or generally the drillers' helpers, are given the chore of wetting the face and muck pile. Respirators are in use in some places where satis-

factory dust control measures have not been effected.

Considerable work has been done by the U. S. Bureau of Mines and U. S. Public Health Service in the Tri-State Mining District.<sup>7-10</sup> Some of the operators continued to carry on a part of the medical work inaugurated by these agencies until 1939. It is now being done by local hospitals.

The progressive operators realized that if the health hazard to which the men were exposed in the mines was to be eliminated, the dust to which they were exposed would have to be controlled. Since the ore is highly siliceous, the maximum limit of dustiness was set at 5.0 million particles per cu. ft. In 1936 the Tri-State Ore Producer's Association employed an air hygiene engineer so that routine dust sampling could be carried on in the mines desiring this service. This work has been in progress for about 4 years, and over 4,000 dust samples have been collected. The air hygiene engineer has worked very closely with the operators in eliminating dusty operations. During the first year's sampling, 76 per cent of the samples showed counts of less than 5.0 million particles per cu. ft. During the last fiscal year, 88 per cent of the counts were below this figure.<sup>11</sup>

In studying dust conditions in the miners' working environment, the mines were divided into two groups. Group 1 included those mines which have not had routine dust sampling, and Group 2, the mines in which this service has been in progress for several years. The results are shown in Table 2.

The effect of dust sampling in the Group 2 mines is discernible in Table 2. The average dust concentration for the different occupations is lower in each instance in those mines in which routine samples have been collected than in those which have not had this service, to determine the efficiency of the dust control measures employed.

TABLE 2

*Dust Exposures by Occupation in Mines Which Have Not Had Routine Dust Sampling (Group 1), and Mines Which Have Had This Service (Group 2), in Millions of Particles per Cubic Foot of Air*

Occupation	Group No. 1				Group No. 2			
	Samples	Average	Max.	Min.	Samples	Average	Max.	Min.
Drillers	25	6.6	29.0	1.6	4	1.6	2.4	0.4
Shovelers	35	4.3	15.6	0.3	43	2.7	31.4	0.3
Hoppermen	3	9.3	20.9	2.6	0	...	...	...
Drag Operator	2	7.4	10.5	4.2	2	2.4	2.5	2.2

It is interesting to note also that in the Group 1 mines, drilling is a dustier occupation than shoveling. The experience of the air hygiene engineer employed by the association, as well as the results indicated, show the opposite to be the case. The high counts recorded for the drillers were due to their collaring holes dry. This was found to be fairly common practice in some of the mines. All of the mine operators have regulations requiring collaring holes wet, but this dust control measure has not been enforced as stringently as it should be in some places.

In the mines in Group 1 the dust counts at drilling operations varied from 29.0 to 1.6 million particles per cu. ft., while in the mines in Group 2 these samples ranged from 2.4 to 0.4 million particles per cu. ft., with averages of 6.6 and 1.6 million particles respectively. The number of samples collected at drilling operations in the latter group (indicated as only 4) is somewhat misleading since many of the samples included under shovelers were collected adjacent to drillers.

Dust samples taken adjacent to the shoveling operations show averages of 4.3 and 2.7 million particles per cu. ft. in the Group 1 and Group 2 mines respectively. The counts ranged from 15.6 to 0.3 million particles per cu. ft. in the former mines and 31.4 to 0.3 million particles in the latter. The high count in the Group 2 mines resulted from a driller collaring a stope hole dry. The sample was collected

about 10 ft. from the machine, and the exhaust was such that the dust was carried to where the sample was being collected. The high counts at shoveling operations in the Group 1 mines were generally obtained in poorly ventilated jugs where the drill holes were persistently collared dry, causing a building up of the dust concentration throughout the working day.

In a jug in one mine, counts of 29.0 and 15.6 million particles per cu. ft. were obtained at a drilling and shoveling operation in proximity to each other. The driller was observed to collar a hole dry during the time that the sample was collected adjacent to the machine. These high counts together with the reasons for their being high were discussed with the operator. Arrangements were made for a series of check samples, the operator being instructed to have the drillers collar all holes wet, and to have the muck wet thoroughly before shoveling and dust sampling was started. Samples were collected at 45 minute intervals through the morning at the shoveling and drilling operations, and the counts varied from 2.7 to 4.7 million particles per cu. ft. This indicates that the dust in the mines can be controlled through the use of dust control devices already available in all of the mines.

This is illustrated again by the samples collected close to the hoppermen and drag operators in the Group 1 mines. In one mine, at the former occupation, a dust sample showed 20.9

million particles per cu. ft. A check sample taken a short time later, after a water spray had been installed near the hopper and additional emphasis was given to wetting the muck, showed that the count had been reduced to 4.3 million particles per cu. ft. A similar reduction from 10.5 to 4.2 million particles per cu. ft. was noted for the drag operator.

Inspection of the mines indicates that there has been an increased effort on the part of nearly all operators to provide better working conditions in them. Considerably more water is being used for wetting down muck piles and haulage ways, and the use of water sprays around hoppers, drag operators, in drifts, and headings has increased markedly.

In addition to the increased use of water, ventilation is probably the second most important dust control measure. Much of the work in the mines at the present time is in areas which have been previously cut through. This includes what is known locally as taking up stope (taking up the floor of the drift); shooting the "shines" off the walls of drifts; and exploratory work in drifts. As many of the mines are cut through to each other and there are numerous shafts extending from the drifts to the surface of the ground, there is good natural ventilation of large portions of the mines. The large excavated areas underground provide large volumes of unpolluted air for dilution of dust concentrations that might otherwise develop. Mechanical ventilation is used where constricted, dead-end workings or "jugs" exist.

#### SUMMARY

A study of surface and underground dust conditions in the Picher District of the Tri-State mining area has been in progress for the past 8 months. Eleven surface dust sampling stations were spread across the mining field and 1,366

samples were collected to June 30, 1940. Control stations on the north and south sides of the field show average counts of 0.3 and 0.4 million particles per cu. ft. respectively. Station 7, selected as being representative of the worst conditions in the district, shows an average count of 3.3 million particles. Individual counts range from 0.1 to 66.0 million particles per cu. ft. The average for all eleven stations is 1.0 million particles. Fifty-one dust samples were collected in houses in the district and show counts ranging from 0.3 to 3.2 million particles per cu. ft., with an average of 0.8 million. It will not be possible to forecast safe limits of dustiness until medical studies of individuals who have not worked in dusty occupations but are living in the district are completed.

Some of the mines have had a routine dust sampling service during the past 4 years. Comparison of the mines which have had this service (Group 2) with those which have not (Group 1) shows that dust conditions are not so good in the latter group. The average dust counts for drillers in the Group 1 mines was 6.6 million particles per cu. ft. compared with 1.6 million for the Group 2 mines. Counts ranged from 29.0 to 1.6 million particles per cu. ft. in the former group and 2.4 to 0.4 million particles in the latter. Samples collected at the shovelers show averages of 4.3 to 2.7 million particles per cu. ft. respectively. Individual counts ranged from 15.6 to 0.3 million particles per cu. ft. in the Group 1 mines and 31.4 to 0.3 million particles in the Group 2 mines. Collaring holes dry was found to be the worst source of dust.

Dust control measures include wetting muck piles and working faces and haulage ways, use of sprays in headings and drifts and at the mechanical loaders, shooting off shift, collaring holes wet, and ventilation. Dust sampling in confined places has indicated that,

where these dust control devices are applied properly, the dust concentration can be maintained below 5.0 million particles per cu. ft.

#### REFERENCES

1. Dills, Charles C., and Nichols, A. L. Preliminary Industrial Hygiene Survey of the Kansas Zinc and Lead Mines. The Kansas State Board of Health, *Investigation Rept. No. 1*, Dec., 1937.
2. Living, Working and Health Conditions in the Tri-State Mining Area, Missouri, Oklahoma and Kansas. A Preliminary Report. Tri-State Survey Committee, Inc. New York, N. Y., 1939.
3. Bloomfield, J. J., and Dalla Valle, J. M. The Determination and Control of Industrial Dust. *Pub. Health Bull. 217*, Apr., 1935, pp. 40-42.
4. Thompson, L. R., Russell, A. E., Bloomfield, J. J., Brundage, D. K., Goddard, Jennie C., and Britten, R. H. The Health of Workers in Dusty Trades. VI. Exposure to Municipal Dust (Street Cleaners of New York City). *Pub. Health Bull. 208*, July, 1933, p. 22.
5. Katz, S. H., Smith, G. W., Myers, W. M., Trostel, L. J., Ingels, M., and Greenburg, L. Comparative Tests of Instruments for Determining Atmospheric Dusts. *Pub. Health Bull. 144*, Jan., 1925.
6. Climatological Division, Weather Bureau, U. S. Department of Agriculture.
7. Higgins, Edwin, Lanza, A. J., Laney, F. B., and Rice, G. S. Siliceous Dust in Relation to Pulmonary Disease Among Miners in the Joplin District, Missouri. *Bu. Mines Bull. 132*, 1917.
8. Lanza, A. J. Miner's Consumption, A Study of 433 Cases of the Disease Among Zinc Miners in Southwestern Missouri. *Pub. Health Bull. 85*, 1917.
9. Sayers, R. R., Meriwether, F. V., Lanza, A. J., and Adams, W. W. Silicosis and Tuberculosis among Miners of the Tri-State District of Oklahoma, Kansas and Missouri. *Tech. Paper 545*, Bureau of Mines, 1933.
10. Meriwether, F. V., Sayers, R. R., and Lanza, A. J. Silicosis and Tuberculosis among Miners of the Tri-State District of Oklahoma, Kansas and Missouri. *Tech. Paper 552*, 1933.
11. Conference on Health and Working Conditions in the Tri-State District, Joplin, Missouri, April 23. U. S. Department of Labor, Division of Labor Standards, Washington, D. C., p. 14.

## DISCUSSION

H. J. DARCEY

*State Sanitary Engineer, State Department of Health, Oklahoma City, Okla.*

IN the discussion of this paper, emphasis will necessarily have to be centered on one phase; namely, that of the underground study, since that is where most of our efforts have been spent. The plans in our state are, however, to make a number of surface dust counts, stations for which have already been selected. These will include samples collected inside buildings, at different hours of the day and night, as well as "outside" samples offering representative conditions under which the people in this area are living.

Being divided only by a state line, the general dust conditions can be assumed to be very similar in the area when passing from one state into another. Our plan, therefore, is to collect surface dust samples over a much shorter period than Kansas officials have planned, and if the results compare favorably as to concentrations with the Kansas results, they will be considered sufficient to use for preparing reasonable recommendations.

#### UNDERGROUND ENVIRONMENT

During the latter part of May, 1940, J. J. Bloomfield visited our state, at which time plans were laid for an industrial survey of underground and surface conditions.

After a general preliminary survey of the majority of mines and mills in the Oklahoma section of the area had been completed, 10 mines were selected for intensive study.

The 10 mines were selected from a group of 50 covered in the preliminary survey, representing a total working population of 2,112. The figure 2,112 does not include the entire working population connected with the mines; however, it does represent the majority. Of the 50 mines originally surveyed, approximately 60 per cent of the population was included in mines, the population was included in mines, members of the Tri-State Ore Producers Association; consequently, when the 10 mines selected for intensive study were picked, 6 were selected which were association members and 4

which were not. The percentage population in the respective mines also remained very close to a 60/40 ratio. The 10 mines were selected to represent as far as possible all conditions and operations that could be expected in the field.

For purposes of study, we have divided the working population in the mines into 5 general classes; namely (1) Face Operations, in which we find approximately 62 per cent of the workers; (2) Underground Transportation and Hoisting, approximately 21 per cent; (3) Maintenance and Service, approximately 8 per cent; (4) Supervision, approximately 4 per cent, and all others approximately 5 per cent. Naturally, the number of samples taken for the various occupations included in these groups will follow roughly the same percentage distribution as is shown above. There are approximately 30 different occupations for which varying numbers of samples will be taken. In Table 1, comparable to Table 2 in the Kansas report, are set forth some of the results obtained so far. Group 1 includes those mines which have not had routine dust sampling, and Group 2, the mines in which this service has been in progress for several years.

It should be noted that here as in Kansas, although the dust concentration as a whole being somewhat higher, the average in the Group 2 mines is lower in every instance (except one in which the concentration is the same) in those mines where routine dust samples have

been collected than in those that have not had this service.

Considering the first two occupations; namely, drilling and shoveling, we have found practically the same trends to exist as indicated in the Kansas report, *i.e.*, in the Group 1 mines drilling occurs as a somewhat dustier occupation than shoveling—whereas in the Group 2 mines the reverse is true. The reasons outlined by Mr. Dills are sufficiently correct.

In the mines in Group 1 the dust counts at drilling operations varied from 16.9 to 1.0 million particles per cu. ft., while in Group 2 mines these samples ranged from 13.3 to 0.3 million particles per cu. ft. with averages of 9.2 and 3.5 respectively. The number of samples collected were 10 and 23 for Group 1 and 2 respectively.

Dust samples taken at shovelers show averages of 8.8 and 4.5 million particles per cu. ft. in the Group 1 and 2 respectively. The counts ranged from 16.1 to 3.7 million in the former and 12.2 and 0.4 million in the latter.

No samples have been taken for the occupation of hopperman, although quite a few samples representing other occupations were collected. However, since comparison with the Kansas report cannot be made and because they are few in number, they will be omitted here.

There is one other operation, that of drag operator, which is indicated in Table 1. These counts ranging from 11.7 to 6.8 and 20.6 to 3.8 in Group 1

TABLE 1

*Dust Exposure by Occupation in Mines Which Have Not Had Routine Dust Sampling (Group 1), and Mines Which Have Had This Service (Group 2), in Millions of Particles Per Cubic Foot of Air*

Occupation	Group No 1				Group No 2				
	Number Samples	Average	Max	Min	Expo- sure	Number Samples	Average	Max.	Min
Drilling	10	9.2	16.9	1.0	6.7	23	3.5	13.3	0.3
Shoveling	5	8.8	16.1	3.7	3.7	32	4.5	12.2	0.4
Hopperman	0	...	...	...	...	0	...	...	...
Drag Operator	1	8.9	11.7	6.8	11.7	7	2.9	20.6	3.8

TABLE 2

*Per cent of Samples Showing Dust Concentration Below and Above 5.0 Million Particles Per Cubic Foot for Mines Which Have Not Had Routine Dust Sampling (Group 1) and Mines Which Have Had This Service (Group 2)*

<i>Occupation</i>	<i>Group No. 1</i>					<i>Group No. 2</i>				
Drilling	40%	less than	5.0	M.P.P.C.F.		74%	less than	5.0	M.P.P.C.F.	
	60%	more	"	"	"	26%	more	"	"	"
Shoveling	11%	less	"	"	"	66%	less	"	"	"
	89%	more	"	"	"	34%	more	"	"	"
Drag Operator	0%	less	"	"	"	14%	less	"	"	"
	100%	more	"	"	"	86%	more	"	"	"

and 2 with averages of 8.9 in each group. Water sprays were in use in all instances where samples were collected near the drag operator.

It will be noted also in Table 1 that the approximate exposure for the various occupations is indicated as usually running lower than the average dust concentration. In the case of machine men there appears to exist comparatively little difference of dust concentration after drilling operations have started; however, the concentration for the first hour or hour and a half in the morning when preparations are made for drilling and approximately the last hour of the working period when drilling has ceased and machine men remove their equipment and load holes, is usually lower than the period in between. This condition naturally brings the exposure for the day below that which it would be if the drilling operation existed throughout the day.

In the case of shovelers, the exposure also runs below the average dust concentration. Ordinarily, the dust concentration at the lay-by (where shovelers haul cans) is much below the concentration that exists where the shoveling operation takes place. The amount of time spent in each place varies with the length of haul, number of shovelers to the can, etc., and can become quite a factor in determining the total daily exposure.

Table 2 indicates briefly the percentage of samples collected which

showed results below and above 5.0 million particles per cu. ft.

Considering the high per cent below 5.0 million particles per cu. ft. in the drilling operation in Group 2, 13 of the 17 representing 74 per cent were taken in one mine with a maximum and minimum count of 2.7 and 0.3 respectively, and an average of 1.5 million particles per cu. ft. This is 2.0 million particles per cu. ft. below the average of the entire Group 2 and 7.7 million particles per cu. ft. below the average of the entire Group 1. This particular mine practised single shift operations and employed two men whose sole duty or job was that of wetting down haulage ways, working faces, muck piles, etc., during the night. This mine employs approximately 95 men while the average of the 10 mines under study was 42.

Many of the mines in recent months have started working double shifts which means that much less time is available for dust to settle before more is created. Also, in several instances, as many as 6 or 8 mines are cut together and air movement goes from one to another; then even if double shifts were practised only in some of these, dust is carried on through to those where perhaps only single shift is practised.

Many problems are created by double shift operations and mines being cut together; however, each mine will have to consider its own particular workings and solve its dust and ventilation problems independently of the others.



# American Journal of Public Health

## and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 31

June, 1941

Number 6

H. S. MUSTARD, M.D., *Editor*

MAZYCK P. RAVENEL, M.D., *Editor Emeritus*

LEONA BAUMGARTNER, M.D., *Associate Editor*

ARTHUR P. MILLER, C.E., *Associate Editor*

AUGUSTA JAY, *Editorial Associate*

### *Editorial Board*

REGINALD M. ATWATER, M.D.

*Chairman, and Managing Editor*

IRA V. HISCOCK, Sc.D.

KENNETH F. MAXCY, M.D.

HENRY E. MELENEY, M.D.

## WE HAVE COME A LONG WAY IN NUTRITION

IT was not long ago when, in prescribing diets, the guiding principle of many a medical man was to forbid the patient those articles of food which had in the past caused the physician himself some gastric distress. If fried foods disagreed with the doctor, the patient got none of them; if cucumbers caused the doctor to eructate, then it followed that cucumbers would make the patient belch. Of course, it was rule of thumb rather than a scientific procedure, and advice so given had to be buttressed by a good deal of bedside manner or office omnipotence to make the patient take it seriously. It is to be noted, too, that with few exceptions diet was something related to the stomach rather than to metabolism. Pediatricians were, of course, concerned with both gastric problems and nutrition, and the internist observed certain empirical rules in patients with diabetes, gout, nephritis, and so forth. Except, however, for patients who had to be "built-up," the physician in laying down a dietary regime was more concerned in excluding those things inimical to his patient's digestion than with including foods necessary in nutrition.

Entirely unrelated to what may be called this dietary empiricism, there arose, largely as a result of public health excursions, a consciousness that no small proportion of school children were underweight. Because much of this work was done without benefit of scientific discipline, this condition in underweight children was dubbed malnutrition, and soon, in spite of medical advice to the contrary, school teachers, public health nurses, health educators, with some physicians acquiescing, enunciated the dictum that any child ten per cent or more underweight was malnourished. This concept attracted public attention and became popular, but was unfortunate in that malnutrition is a blanket term, quantitative rather than qualitative, and is not synonymous with underweight.

In the meantime, information had commenced to leak out of research laboratories, the old knowledge of the rôle of cod liver oil and fruit juices was commencing to attain a new significance, and the problem of pellagra was on the way to partial solution. Milk was being publicized as the perfect food, and home

economists, though still somewhat under the influence of calories, were beginning to recommend to housewives a fairly balanced ration. Then came a fast flood of vitamin discoveries and a realization that minerals, even in infinitesimal quantities, played an exceedingly important rôle in the nutrition of the individual. As information from the biochemist, the physiologist, and the clinician accumulated, a new perspective became possible and malnutrition could be seen in its qualitative aspects. The man in the laboratory raised his sights from rats and guinea pigs to human beings. Grudgingly at first, but later rather completely, he recognized that those who had attained the status of nutritionists by the home economics route might, after all, serve a purpose. The clinician on his part decided to leave the problem of eructation to the gastroenterologist, and came to a realization that deficiency diseases might exist in subclinical form.

A few next steps opened up new possibilities in the field of nutrition. The synthesis of a number of vitamins was effected: vitamin complexes were broken down into their component parts, advances were made in precise technics for determination of the status of the individual in regard to certain of these protective substances. Foundations, recognizing the necessity of carefully controlled research, made generous grants for both laboratory and field work. And finally the public and government became interested in a new way: Where previously malnutrition had been thought of vaguely as underweight, many laymen now know that there are many different kinds of malnutrition, and that not only is a specific diagnosis and a specific treatment necessary, but that most of these conditions can be prevented by care in quality and balance of diet.

At last, after years of effort, the problem of nutrition in the mass has come to be accepted as a public health responsibility. The potentialities here are almost unlimited, and as greater knowledge and more exact and applicable diagnostic methods are developed, we shall enter fully into one of the great epochs of public health.

## DELAYED BIRTH REGISTRATION

THE native born citizen of the United States has tended to take his citizenship for granted. He has been inclined to consider himself in a position somewhat superior to that of the foreign born, for whom he was mildly sorry because such persons could prove their citizenship by nothing more than naturalization papers. Aside from verging upon the snobbish, this condescension often is ill founded; and many an individual born in the United States, when called upon for proof of parentage, age, and place of birth, is shocked to find that he cannot provide documentary evidence of these facts. The naturalized citizen, with his naturalization a matter of federal record is, therefore, in much better position than is the individual who cannot produce a certified copy of his birth certificate.

In the past there was not so much need for proof of citizenship, and in such cases as did arise, almost any kind of document or affidavit was accepted as evidence. More recently, new demands have arisen for proof of one or more items in the triad: age, place of birth, parentage. These demands have become more exacting with the increase in local, state and national benefits and obligations: school attendance, employment, voting, marriage, military service, work relief, welfare, pensions of one sort or another, and in connection with other various

phases of an increasingly complex social order. In attempting to provide the necessary data, individuals have had to deal with the most diverse of agencies, agencies of local, state, and national government, of industry, of voluntary organizations. Except for a certified copy of birth certificate there has been no commonly accepted basis of proof of citizenship in these various agencies. Not only that, but within the respective governments there has been wide variation between agencies as to what would be considered as evidence. To add to the confusion, the person without a birth certificate, attempting to establish proof of age, etc., yielded his original documents in each case to the agency with which he dealt, and if a similar necessity ever arose in the future, he must again go through the same process, or perhaps a more complicated one.

For many years, the state registrars of vital statistics played only a negative rôle in this drama. The applicant's birth certificate either was or was not on file. If not, the matter was out of the registrar's hands unless his state's vital statistics law had provided for delayed registration of births, which was not usually the case. Now, registrars of vital statistics are assuming an important and constructive part in solving the problem of delayed registration of births. Through individual effort, through the effective interest and action of the American Association of Registration Officials, through coöperation of federal agencies, uniform standards and procedures are on the way to becoming realities. Under date of April 25, the Census Bureau, after a series of conferences with those concerned, released recommendations for registration of delayed certificates of birth. By definition, births registered after age 4 are considered as delayed in registration. The requirements for establishing the facts of birth in delayed registration are that genuine documentary evidence must support statements as to age, birthplace, and parentage; that these items must each be proved by two independent records established before the individual became 4 years of age, or by three independent records executed after that age. In the latter case, the records themselves must have been executed at least 5 years previously. Thus a man of 30, attempting to establish facts of birth, could not use as evidence records of the past 5 years.

The type of evidence recommended as acceptable, in order of preference, is set forth in detail under nine general headings, the first of which is the baptismal, cradle roll or other church record, the last an affidavit from a person who presumably knows and remembers the date and circumstances of the birth of the person in question. The seven kinds of records between these extremes include sources to which one would ordinarily turn, and with which most persons have had some contact. The recommendations of the Census Bureau further indicate desirable procedures to be followed in review of evidence, and finally presents a uniform "Delayed Certificate of Birth," which once having been registered may serve as the basis for a certified copy.

All of this is most commendatory, but it will cost money. Interviewers, reviewers of evidence, summarizers, and additional clerks, etc., will be necessary. A state health department might find its ordinary business seriously interfered with and its usual staff swamped with delayed registration work if wide publicity were given, prematurely, to the possibility of this delayed registration. At present there is confusion as to where funds may come from—local, state, or national governments. The state is the legal repository of such data, the federal government probably the one most frequently in need of it. The ramifications of national defense have in many ways accelerated and accentuated this demand.

There are arguments pro and con as to the propriety of using defense funds for this purpose, and as to a similar availability of Social Security Funds. In any event, it is a matter on which immediate agreement and financial implementation are highly important.

Incidentally, gentle reader, do you know, beyond peradventure of doubt, that the facts of *your* birth are officially recorded, in terms of a birth certificate, in the state in which you were born?

# Credit Lines

A Selective Digest of Diversified Health Interests

D. B. ARMSTRONG, M.D., AND JOHN LENTZ, M.S.

## CREDIT—WHERE CREDIT IS DUE

Health educators should count as one of their blessings a group of men and women whose duty it is to report through the nation's press the progress of science. We could have no more valuable ally in our educational work than this group of "science writers" whose stories on health, medical, and other scientific advances are prominently featured by the country's leading newspapers and press associations. The coverage given these fields during recent years in both news and editorial columns has been extensive. But of more importance is the fact that the majority of the stories printed contain information of definite health import.

In reviewing the work of the "science writers," one is impressed by the fact that they have played a stellar rôle in keeping the general public abreast of advances in cancer therapy, chemotherapy, serum therapy, and many other fields. When one considers that these stories have reached millions of readers throughout the land, the contribution made by the "science writers" to health and popular medical education looms large.

In many cases, the "science writers" have been instrumental in paving the way for the acceptance of new forms of therapy. This was demonstrated to one of the editors of this section a few years

ago during a visit to a state health department in the South. At that time sera for the treatment of pneumonia were being successfully used in other sections of the country. The southern health officer, however, had not been able to supply sera for use in his state due to the high cost. Nevertheless, there was a constant demand for sera—a demand which was attributed to the public's knowledge of pneumonia sera, gained from reading newspaper articles by "science writers." Medical and health officials have long deplored the fact that a gap exists between the discovery of a scientific procedure and its practical application. It would appear that the "science writers" are helping us to bridge this gap and in so doing they are performing a genuine service to the nation. Certainly the acceptance of the "sulfa" drugs has been expedited by the reams of copy that science reporters have placed in newspapers.

Although these men and women of the press must always consider "news values" in their work, their reporting of scientific material has been so uniformly excellent that scientists in all fields are gladly cooperating with them. Scientists have come to realize the importance of having their work interpreted to the public by writers who can translate the language of the research laboratory into terms which the general public comprehends. The partnership between the scientists and the press is becoming closer every year.

The reporting of health and medical news has been especially commendable. The "science writers" have used restraint in cases where their news instincts probably prompted them to "spread it on thick." They have avoided sensational claims, half-truths, and the like, because they know that the field which they are covering must be reported accurately or else great damage might be done to human life, health, happiness, and well-being.

Whenever as health educators we have occasion to take stock of the achievements of our profession, the work of such writers as Waldemar Kaempffert, William Laurence, David Dietz, Howard Blakeslee, Watson Davis, Gobind Behari Lal, John J. O'Neill, Jane Stafford, and Marjorie Van de Water should not be overlooked. They, as well as we, have shouldered a large part of the responsibility for spreading essential health and medical information.

#### INFORMATION PLEASE

The U. S. Office of Education of the Federal Security Agency has organized a new service known as Information Exchange on Education and the National Defense. The service acts as a clearinghouse for new ideas, new materials, and new courses in education that are especially pertinent to national defense. Health educators who are engaged in any activity that would be of value in this connection should notify the Information Exchange and furnish a description of the project, with samples of any educational aids used (photographs, radio scripts, etc.). Three loan packets on health are now available through the Exchange in Washington, D. C. The packets contain bulletins and other materials selected for use among three distinct groups: the elementary school group, the secondary school group, and the adult or citizen group. "Building and Preserving Good

Health" is the theme of the packet materials.

The interchange of new thoughts and new practices is especially desirable today, and this effort on the part of the United States Government to stimulate a flow of new ideas deserves support. "A good idea in Maine may be useful in California," says a circular from the Office of Education in announcing the Information Exchange. Let us do our part by disseminating information about any health project that might implement our defense program.

#### ARE YOU LISTENING?

"Doctors At Work," the current series of radio dramas sponsored by the American Medical Association, are in many respects the best programs that the A. M. A. has produced during the past few years. The script writer has a decided "knack" for developing situations that appeal to Mr. Average Man and his household. This quality is the very essence of successful radio programs—particularly those dealing with medical or health themes. The characterizations in the current series are well drawn, and a fuller utilization of interesting radio effects and technics distinguishes the present series from its predecessors. Health workers should not fail to listen to the A. M. A.'s program.

One of the best programs in the current broadcasts was entitled "The Big Red Schoolhouse." It depicted the work of the school physician and the school nurse, and the various episodes brought out many pertinent health facts dealing among other things with nutrition, vaccination, quarantine, and acute appendicitis. The dream sequence involving the school nurse was unusually dramatic and impressed upon the audience the fact that the school nurse has a real job to handle.

If you have missed the A. M. A. broadcasts to date, check on your local

stations and arrange to listen to the next in the series. The programs are broadcast over the NBC Blue Network every Wednesday evening.

#### THE SPOKEN WORD

Dr. Bruno Gebhard, director of the Cleveland Museum of Health, seems to possess an inexhaustible supply of appealing stories with a health education flavor. One of his latest stories of this nature recently appeared in *The New York Times*. We reprint it here as it appeared in the *Times*:

"After examining a little girl in the fifth grade the doctor told the school nurse to write in the report 'Heart Negative.' It took the mother quite a while to find out what had upset the child. 'Something must be wrong with me,' she sobbed. 'Maybe something is even missing. We had the doctor this morning, and he said my heart is only negative.'

"Dr. Gebhard passes this story along with the comment, 'I can't forget it. The spoken word is still our best means in health education—the change of one little word would make all the difference in the world. Let us make it wherever possible "Heart Positive."'"

#### RE: THE NATIONAL HEALTH LIBRARY

Public health workers who have not availed themselves of the services of the National Health Library are missing a bargain without an equal. Did you know that for less than three cents a day you can become a member of the Library and have at your disposal 6,000 books, and 30,000 pamphlets covering every major field of public health? Did you know that the Library will attempt to find answers to questions that may be puzzling you? Did you know that the Library's card catalogue contains 193,000 cards arranged by subject and author? Did you know that bibliographies will be compiled on request? These and many other specialized services are available to members of the National Health Library which for 21 years has been an efficient and useful

instrument of service to the public health profession.

The Library recently issued an attractive folder extending an invitation to prospective members to make use of its facilities. Write today to the National Health Library, 1790 Broadway, New York, N. Y., for a copy of this folder which will no doubt convince you that your department must have access to this complete and up-to-date store of public health information. The growth and expansion of the National Health Library depend upon a steadily mounting membership. It deserves the support of all public health workers who, at very small cost, can make full use of the Library's services.

#### NEW PUBLICATIONS

Several new health publications that should meet with widespread approval are now available. Topping the list, in our estimation, are two folders produced by the Illinois State Department of Health, one on smallpox and one on diphtheria. We single them out for special mention because they represent an entirely new trend in health literature. Both folders arrest one's immediate attention by virtue of the unusual cover layouts. Historical scenes, executed in blue and white, make up the visually striking covers and in place of specific titles the following statements are used: "ONE FACT—is worth a thousand arguments" (a quotation from Dr. Benjamin Waterhouse who performed the first smallpox vaccinations in this country) and "George Washington was not protected" (referring to the fact that there was no known method of diphtheria prevention during Washington's lifetime). These provocative statements will certainly entice many people to read further. And those who do read further in these folders will not be disappointed, for the text of each is interesting and educational, touching upon the historical aspects of

the subjects, in addition to imparting current information. The center and inside "spreads" of each folder are also excellent in layout and copy. In short, these two publications from the Illinois State Department of Health would compare very favorably indeed with the more elaborate and expensive promotional material issued by the pharmaceutical houses, for instance. We hope these folders are prophetic of what may come from other health departments in the future.

From the Life Conservation Service of the John Hancock Mutual Life Insurance Company comes a revised edition of that company's publication entitled "Between Two Years and Six." Many health workers are familiar with the first edition of this booklet which was issued ten years ago. Since that time many advances have been made in pediatric practice and the new version of the John Hancock booklet reflects these changes. The text of this publication was prepared by Richard M. Smith, M.D. who is well qualified to write such a booklet by virtue of his rich experience in pediatrics at the Harvard Medical School and other institutions.

Some of the worth while emphases in this valuable booklet are: the stress placed on periodic gain in height and weight, the suggestions on proper clothing for children, the discussion of meals, eating habits, emotional development, and preventive medical procedures (including, incidentally, a recommendation for the use of pertussis vaccine).

The publication is attractively illustrated with simple line sketches and it goes without saying that *Between Two Years and Six* will be a welcome handbook for many mothers.

(Incidentally, why is it that the father's responsibility in child care is so often overlooked or minimized? His rôle in the child's upbringing is fre-

quently as important as that of the mother and he needs as much instruction and understanding as she does.)

"Are We Well Fed?" is the title of a new publication issued by the government to implement the current campaign of nutrition education. The material in this booklet stems from the extensive consumption study carried out chiefly by the Federal Bureau of Home Economics. The booklet contains some excellent teaching material which should be very helpful to those engaged in community education. The text might readily serve as a guide to the factors in nutrition that should be emphasized now in connection with defense.

Pictorial statistics are used throughout this publication, though we regret to say that they have not been very skillfully employed. For instance, on two facing pages symbols are used for one-half cent and fifty cents. The symbols are identical except that the half cent symbol is about twice as large as the fifty cent symbol. This will probably confuse some users of the booklet.

"Are We Well Fed?" is for sale, at 15 cents a copy, by the Superintendent of Documents, Washington, D. C.

#### NEW TRENDS IN SCHOOL HEALTH WORK

Two basic assumptions are widely accepted by educators and health workers as fundamental in a school health program. They are: (1) the teachers' interest in the health of pupils, (2) the school health program as an integral part of the community health program. It is news, however, when these theories become concrete policies in a school health program. We are reminded of this by the receipt of a manual recently issued by the Department of Education and the Board of Health of the State of Oregon to aid teachers in the use of a new pupil health record card. As is expressed



very succinctly in the introduction of the manual, the new school health program utilizes the unique and vital position of the classroom teacher. Furthermore, emphasis is given to the fact that the modern school health program depends upon community teamwork. In addition to the parents, the school administrator, the teacher, the public health nurse, and the health officer, the manual points out that there are private physicians and private dentists, social, civic, and volunteer groups, each with a skill, a strategic opportunity, a responsibility, and a contribution to make toward an effective health program in the school. This concept is similar to the underlying philosophy of the present New York City School Health Program. The Oregon pupil health card has been modelled on the health record form adopted by the New York City Board of Education in 1939 for use in the elementary and junior high schools of the city.

These developments in Oregon and New York City stem from the 4 year study and demonstration of school health procedures undertaken by the School Health Study, under the sponsorship of the Departments of Health and Education of New York City.

It is perhaps significant that, although the final report of the Astoria, N. Y., School Health Study will not be released until the fall, one progressive state is already adopting some of the methods and philosophy growing out of this important research in school health procedures.

#### BRITAIN DELIVERS THE GOODS

Any "doubting Thomas" not yet convinced of the durable texture of British morale should have an opportunity to examine a small collection of pamphlets that has finally reached our desk after a perilous journey from London. These pamphlets, showing signs of damage from both fire and water, were

salvaged from the bombed London warehouse of His Majesty's Stationery Office. Following this first adventure, they were again bombed while part of the cargo of an outward bound boat which was attacked off the coast of Ireland. The boat was beached, the cargo salvaged, and eventually the pamphlets reached their destination by way of Canada. This is their odyssey in brief—but the water marks, the charring, the stains, and the smell of gunpowder tell us only half the story. We have examined these publications as curiously as if they came from another world. Still we realized while looking at them that it may yet be our duty as public health workers to devote our attention to the preparation of similar booklets—booklets bearing such titles as: *Your Home As An Air Raid Shelter*, *Food and Its Protection Against Poison Gas*, *The Training and Work of First Aid Parties*, *Rescue Parties*, *Organization of Decontamination Services*.

These British booklets are written in a style that is clear, concise, and to the point. In fact the very language employed conveys something of the calm with which the British have come to face their problems. Much of the material is presented in outline form and diagrammatic illustrations are used to clarify certain procedures difficult to explain to laymen. A hint as to why the English are able to "take it" is found in a first aid book, much of which is written in verse form. Here are two of the verses:

#### CHOKING GASES

Phosgene and Chlorine are, alas!  
Chloropicrin, too, a deadly gas.  
Affects the lungs, affects the breath,  
And very soon may lead to death.  
The only hope is perfect rest;  
Remember this and do your best.  
Pop on a mask and quickly fetch her,  
Without the least delay, a stretcher.  
Don't let her move; give her beef-tea,  
Keep her as warm as she can be.

Don't give her alcoholic drinks;  
Persuade her to have "forty winks,"  
And in spite of great temptation  
Don't try artificial respiration.

### BLISTER GAS

When you have heard the warning sound  
That Mustard Gas is on the ground,  
Put on the mask that you possess;  
All helpers have protective dress.  
Remember, 'tis persistent gas.  
Will last for weeks on roads or grass.  
The smallest splash upon your hand  
Will quickly to a sore expand.  
If on a person there's a trace,  
Rush him to the appointed place,  
Take off his boots and clothes and suit  
And scrub him well from head to foot.  
Then in another room he'll find  
Fresh clothes and boots, assistance kind.

Has any other nation at war ever  
turned to verse as a means of informing  
its people about such grim subjects?  
This seems to epitomize the courage  
that is inherent in these people. As  
long as they can write verses about first  
aid, the final outcome of the struggle  
seems clear. Adolf, you haven't a  
chance!

### MAGAZINE ARTICLES

Current popular magazine articles on  
health or of medical import:

"The Health of the Nation" (in two  
parts). C.-E. A. Winslow, Dr.P.H., April  
and May issues of *McCall's Magazine*, 1941.

"Vitamins for Everybody." Paul de Kruif.  
*The Readers' Digest*. May, 1941.

"How Is Your Bedside Manner?" Jo  
Chamberlin. *Your Life Magazine*. May,  
1941.

"Rating My Town's Health Work." W.  
F. Walker, Dr.P.H. *The Independent Woman*.  
February, 1941.

"War and Disease." George W. Gray.  
*Harpers Magazine*. May, 1941.

"Are You a Droop?" Norman L. Hoop-  
ingarnier. *American Magazine*. June, 1941.

"Can Insomnia Conquer England?" Iago  
Galdston, M.D. *The American Mercury*.  
May, 1941.

"Don't Be Afraid to Face Cancer." Sophie  
Gordon. *Woman's Digest*. May, 1941.

"More Sudden Death." (No author given.)  
*Ladies' Home Journal*. May, 1941.

"Rheumatic Fever." Maxine Davis. *Good  
Housekeeping*. May, 1941.

"The Great American Menace: Heart  
Disease." Gretta Palmer. *Cosmopolitan  
Magazine*. June, 1941.

"What Does a Child Inherit?" Josephine  
H. Kenyon, M.D. *Good Housekeeping*. May,  
1941.

(The above is not presented as a  
complete list and the articles cited are  
not necessarily recommended.)

### NOTED AND QUOTED

Readers of this section will recall that  
in previous issues significant quotations  
from various sources were printed under  
the heading "Noted and Quoted." A  
request for additional quotations has  
brought the following:

"Science is more than the technologies  
which cluster about it—more than its inven-  
tions and gadgets. It is even more than dis-  
covery and correlation of new facts. Science  
is a method, a confidence, and a faith. It is  
a method of controlled and rechecked ob-  
servations and experiments, objectively  
recorded with absolute honesty. It is a con-  
fidence that truth is discoverable. It is a  
faith that truth is worth discovering."

Raymond B. Fosdick

President of The Rockefeller  
Foundation

"It is urgent now that the people of this  
nation be physically tough, mentally strong,  
and morally sound."

Thomas Parran, M.D.

Surgeon General, United States  
Public Health Service

"'Shoe leather epidemiology' in regard to  
tuberculosis case finding differs from 'swivel  
chair epidemiology'—which consists of at-  
tempting to solve a problem by prepared  
statistics—in that it means going out on the  
highways, byways, and alleys, climbing the  
stairs, walking the streets, or bumping over  
country roads in order to ferret out the  
sources of tuberculosis infection."

Edward S. Godfrey, Jr., M.D.

New York State Commissioner  
of Health

"You cannot stop contagious disease with  
a law, a health officer, and a placard. You  
must get coöperation of the people by edu-

cation, by persuasion, and by organization."

*California and Western Medicine*

"Science is not an esoteric cult and scientific methods are not mysterious or magical processes. Huxley once defined science as trained and organized common sense, and scientific methods of inquiry are only the careful and accurate methods that are used by intelligent people everywhere in the affairs of everyday life. These methods consist in observation, comparison, analysis, and generalization. Every sensible person uses these methods in his business or profession, and in his judgment of men, policies, and institutions."

Edwin Grant Conklin, Ph.D.

Professor of Biology, Princeton University

"If I were not Professor of Medicine at Oxford University, I would wish myself above all else to be a district nurse."

The late Sir William Osler

AU REVOIR OR FAREWELL?

As these words are written, the future of "Credit Lines" hangs in the balance. Readers will recall that this section of the *Journal* was undertaken in September, 1940, at the request of the Editorial Board. It was agreed at the outset by the editors of "Credit Lines" and the members of the Board that this section was to be experimental. With this issue of the *Journal*, the experimental period draws to a close.

Whether or not the life span of "Credit Lines" is to be extended rests with the Editorial Board, which will decide either to ring down the curtain on this journalistic venture or to prolong its lease of life under the present editors or under another sponsorship.

Regardless of the Board's verdict, the editors of this section wish to take this opportunity to thank those readers who have made contributions to "Credit Lines." We have received a steady flow of pamphlets, posters, articles, and other materials for review and comment. We hope that the diversified nature of the contents of this section has perhaps kept some readers in touch with developments of which they might not otherwise have been aware.

We are indebted to those readers who have sent us material from all sections of the country, and regret that it was impossible to review every item submitted because of space limitations. These contributions have made us doubly aware of the fact that a wealth of excellent health education material is produced by workers "from border to border and coast to coast." Much of the material reviewed shows originality, freshness, and talent of a high level. May health education continue its present trend!

## BOOKS AND REPORTS

I Remember—*By Abraham Flexner. New York: Simon and Schuster, 1940. 414 pp. Price, \$3.75.*

This autobiography of Abraham Flexner presents a picture of his many sided interests as student, schoolmaster, member of the Carnegie Foundation for the Advancement of Teaching, member of the General Education Board of the Rockefeller Foundation, and founder and first director of the Institute for Advanced study at Princeton.

As a student at Johns Hopkins, Dr. Flexner benefited from the influence and the teachings of President Gilman of Johns Hopkins University, and the group of pioneers associated with him. The Medical School at Johns Hopkins, and the system of medical education prevailing in Germany before the first World War, were used by Dr. Flexner as models for adequate medical education. As a result, Dr. Flexner was committed to the principles of high standards in medical education, and to the theory of full-time professors in both the clinical and pre-clinical branches carried on in medical schools, and devoted much energy toward the establishment of these high values in the United States.

As a result of Dr. Flexner's efforts, medical education in a number of the leading medical schools of the United States were put on what he termed a "university level" by the adoption of full-time teachers, made possible by the establishment of increasing endowments. On Flexner's recommendation John D. Rockefeller set aside the sum of fifty million dollars, to be devoted to the advancement of higher standards in medical education in the United States,

and by skillful planning and much personal effort, Dr. Flexner and his co-workers were responsible for adding a half billion dollars to the endowment of medical schools in America.

The period covered by this book presents a vivid picture of the evolution of medical education from the almost unbelievably low level maintained at the beginning of the present century to the present much more satisfactory standards for medical education in America.

This book of 29 chapters and over 400 pages should be particularly interesting to medical men, educators, and others concerned with higher and more satisfactory educational standards.

CHARLES F. WILINSKY

Sewage Treatment Works: Administration and Operation—*By C. E. Keefer. New York: McGraw-Hill, 1940. 673 pp. Price, \$6.00.*

This timely and needful book shows a definite purpose with careful planning and execution. It is stated to be the first book since 1914 devoted exclusively to the operation of sewage plants. Rapid progress in sewage treatment has been achieved in recent years. Older methods of treatment have been improved or outmoded, new processes have been developed, mechanical equipment has come into general use, extensive research has been conducted, and a tremendous volume of widely distributed literature and experience has been accumulated. The apparent purpose is to provide an up-to-date text and reference book, not only for plant superintendents and operators but also for state and municipal officials, designing engineers, and others who should be

familiar with operating problems and their solution.

This book provides a practical manual for the operation of sewage treatment plants, but it is much more than this. Several entire chapters and a considerable portion of most chapters are devoted to the basic principles of sewage treatment and to concise descriptions of the various methods and equipment available for different types of plants. The discussions of fundamentals and of the numerous aspects of plant operation are supported and amplified by nearly 200 tables of selected data, 167 photographs, charts, and other figures, and 850 references listed at the ends of chapters. An excellent index occupies the last 62 pages.

In spite of the volume of material covered and the comparison of conflicting opinions and competitive equipment, the book is not controversial or confusing. The text is clear and concise, adheres to conservative practice, and does not extend itself unduly into the fields of design and construction. For use as a reference book by those who have difficulty in obtaining quoted publications, the few extra pages necessary to have included the titles and number of pages of each reference would have been fully justified. Also certain tables on the same subject would be more useful if they could have included comparable data such as population served, sewage flow, and rates of filtration which were sometimes omitted. The logical arrangement, cross-references in the text, the frequent use of outlines to present details, and a clear marking of chapter headings and sections all make for convenience and ease of use.

The allocation of space to various subjects is logical, with major emphasis on treatment processes that are well established and widely used. Of the 32 chapters, the first 5 are devoted to general subjects such as principles of

administration, characteristics and composition of sewage, and methods of analysis. Most other chapters deal with particular treatment processes with 4 chapters on disposal of sewage effluents, plant beautification, sewage plant records, and the cost of sewage treatment respectively. Most chapters follow a rather uniform plan including a concise definition of the problems covered and methods of solution, a discussion of fundamentals, a description of structures and apparatus, general and detailed suggestions for operation and maintenance, and an analysis of operating costs. Emphasis is placed on public health consideration including the necessity for supervision of plant operation by health departments and the responsibility of the operator to produce an effluent which will prevent danger to health.

All in all this first edition reflects the ability, serious purpose, and conscientious work of the author and should prove a valuable contribution in the interest of more efficient and economical sewage treatment. ROY J. MORTON

*Psychiatric Social Work—By Lois Meredith French. New York: Commonwealth Fund, 1940. 343 pp. Price, \$2.25.*

This book makes available for the first time a very comprehensive description and analysis of the field of psychiatric social work. Sponsored by the American Association of Psychiatric Social Workers, a study of this professional field was conducted over a period of years under the supervision of the Advisory Committee on Standards. Psychiatric social work is defined as "social work practiced in connection with psychiatry and mental hygiene in organizations that have for their primary purpose the study, treatment and prevention of mental and nervous disorders."

After a discussion of social work in

relation to psychiatry, the origin and growth of psychiatric social work is described and analyzed. First developing in mental hospitals and clinics about 25 years ago, trained psychiatric social workers later came to be employed in various capacities in a wide variety of social and educational agencies and institutions. A statistical analysis is presented of the number and training of workers, types and turnover of employment, salaries and opportunities for placement.

Probably the sections of most interest to workers in the public health field are those dealing with psychiatric social work in hospitals and clinics, in public health nursing organizations, and trends in social treatment. Requirements for admission and graduation and content of courses of training in psychiatric social work are also of interest to those who might be interested in entering the field.

CLARA BASSETT

The Association's Work During 1939-40. *Toronto: Canadian Public Health Association*, 1941. 53 pp.

This twenty-eight year old Association of 2,800 members, through active committees, accomplished much during the year reported toward improved standards of health administration and service. A survey of full-time health units in Canada, including some 75 municipalities, was conducted (forms appended to this report) to provide information on the number and training of personnel, scope of organization, and extent of expenditures for health, hospital, and associated services.

Fifty-four candidates presented themselves for examinations, held in seven provinces, leading to the certificate in Sanitary Inspection. Since this unique venture was initiated by the Association in 1935, certificates have been awarded to 180 sanitary officers. A new edition of the 260 page manual for instruction for sanitary officers was published.

Certification is becoming the standard of qualification for employment in municipal and provincial health departments. "Not only is there a better appreciation by the appointing bodies of the contribution of the sanitary officer to the health program, but it raises the status of the individual inspector and has the added advantage of taking such appointments out of the field of local politics."

The conduct of the third Canadian Rural Health Conservation contest demonstrated the value of this method of stimulating local interest in health departments. The contest was held in 30 participating units through the coöperation of the American Public Health Association and with financial support from the W. K. Kellogg Foundation. A committee worked on the preparation of a Standard Milk Ordinance and surveyed the extent of milk distribution in municipalities of 2,000 population and over. The Laboratory Section held a Christmas meeting with representatives in attendance from all parts of Canada. Gratifying progress is reported by the Vital Statistics Section in strengthening the teaching of vital statistics in medical schools. Another noteworthy achievement was the publication of *The Development of Public Health in Canada*, a review of the history and organization of public health in the nine provinces, with an outline of the Health Section of the Federal Department of Pensions and National Health. IRA V. HISCOCK

The Romance of Medicine in Canada—By J. J. Heagerty. *Toronto, Canada: Ryerson Press*, 1940. 113 pp. Price, \$1.25.

Tragedy and drama certainly, but hardly romance, is this epitome or summary in pocket form of the author's important earlier work *Four Centuries of Medical History in Canada*.

Dour and bitter was the struggle for

life, for national empire, for the exploitation of Christianity, along the shores of the St. Lawrence and at the seaports. Familiar is the story of superstition, ignorance, devotion, loyalty to King and Church in their experience with the fury of diseases which swept away Indians and colonists, ships' crews and passengers, Sisters, surgeons, and explorers with equal ruthlessness.

Concise, reasonably complete, well documented, with generous and aptly chosen quotations the story sweeps swiftly through the 113 brief pages of this pocket narrative refreshing alike to lay and medical reader in the review of the characteristics of scurvy, smallpox, typhus, plague, cholera, and syphilis in all their raw brutality unopposed by effective knowledge or resources.

A glimpse of such medical care as prevailed under the French regime; admirable notes of the origin and sequence of hospitals from 1639 to recent times; the mystery of the Mal de Mal Baie, the story of leprosy and influenza; the personalities and growing strength of medical education and institute aid for the sick since the British have controlled the Dominion; and finally a few words of the practice of the curative and preventive arts of medicine to recent times; of such is the substance of the 9 chapters, each a convenient unit for a lecture to students of medicine, nursing, or public health.

Our best wishes go to the author who has devoted his scholarship to this token, this practical contribution to war relief through the Canadian Red Cross.

HAVEN EMERSON

**Diagnostic Procedures and Reagents**—By various authors. 1st ed. New York: American Public Health Association, 1941. 352 pp. Price, \$2.75.

The usefulness of *Standard Methods of Water Analysis* has doubtless prompted the preparation, under the

auspices of the American Public Health Association, of what might be regarded as a companion volume in the field of communicable diseases. The resulting book is excellent in concept and good in execution, and should prove to be an indispensable addition to the library of practising bacteriologists and serologists.

The first section, devoted to a description of culture media, stains, reagents, and solutions, is remarkably complete. The formulae, together with brief but explicit directions for preparation, are given for over sixty different media. In the next section the bacteriostatic action of various dyes is described, and then follow papers on the principal diseases and organisms with which the public health laboratory is called upon to deal. Each topic is covered by a writer of competence in the particular field under discussion, and the entire book represents a concise and authoritative presentation of the laboratory methods of choice in the diagnosis of the communicable diseases. There is a good bibliography.

In the first edition of so ambitious a work, it is to be expected that omissions will be noted and the need for changes recognized. The chapter on the toxicity of dyes could profitably be expanded to include a discussion of other bacteriostatic agents. Methods for the recovery and identification of the dysentery bacillus should receive fuller treatment, and inclusion of a brief chapter on the laboratory diagnosis of Weil's disease is indicated.

Perhaps one of the most difficult problems confronting the editor of a book of this sort is the extent to which the serodiagnosis of syphilis is to be covered. While the section in this book is admirably written, it is obviously a compromise and in the reviewer's opinion not altogether satisfactory. The complement-fixation test is adequately described, but an attempt is

made to give only the general principles of the flocculation test. Since the average serologist probably tends to think in terms of a specific test, regardless of the essential similarity of most of the tests, it would be desirable to give more precise directions for performing several of those in common use.

These minor criticisms should not obscure the real merit of the book. It is more comprehensive than the ordinary laboratory manual and more serviceable for routine use than some of the larger texts on laboratory methods.

THOMAS B. TURNER

*Sewage Treatment—By Karl Imhoff and Gordon Maskew Fair. New York: Wiley, 1940. 370 pp. Price, \$3.00.*

The authors' statement that this is a book intended to present briefly and simply the considerations and calculations that enter into the design and operation of modern sewage treatment plants is a fair and to-the-point assertion of the book's scope and value.

The book is different in that extraneous description of sewage treatment units has been omitted and the essentials of best practice are presented in a form readily understandable. The book can hardly be recommended for persons without some technical knowledge or experience in the field, as the authors jump quickly and deeply into the heart of modern sewage treatment practices.

The volume has several particular appeals for the designer and operator of sewage treatment plants:

1. It furnishes an up-to-date authoritative brush-up course on current practice and will no doubt clarify many phases of the subject for the reader.

2. The diagrammatic sketches, tables, and graphs used to illustrate the text, are complete, readily deciphered, and exclude unnecessary detail frequently present in photographs. There are no photographs in the book.

3. The text is crammed with data on quantities of sewage materials, permissible loadings

of units, design factors and operating results to be expected from various treatment units. These data are an extract of the best information available and have been presented in the most concise form of any book to appear in recent years.

4. The reader will like the illuminating section on Industrial Waste, which is condensed into 30 pages and includes a table on the composition of all the more common wastes.

5. It discusses clearly and adequately the important co-subjects of self-purification of receiving waters and the considerations which should be made in disposal of sewage in such waters.

The book closes with chapters on sample calculations and a suggested reading list to supplement the material presented in the volume. It is a reference book which should be pulled off the shelf frequently.

LEROY W. VAN KLEECK

*Mental Health in the Classroom (13th Year Book)—By the Department of Supervisors and Directors of Instruction. National Education Association, Washington, D. C., 1940. 304 pp. Price, \$2.00.*

*Mental Health in the Classroom*, not to be confused with *Mental Hygiene in the Classroom*, which is a 44 page pamphlet published by the National Committee for Mental Hygiene, is a rather comprehensive treatment of the teacher's problem of promoting the wholesome mental growth of children. It is intended, as Paul Witty, Chairman of the Committee says in his introduction, "for school people and directed toward the problems of teachers, administrators, and supervisors." There is no doubt, however, that this book will be helpful to others who work daily with children.

It is possible here, only to outline the scope of the book. It is divided into three sections. Section I contains 5 chapters which discuss the basic concepts of mental hygiene. By far the most stimulating and readable chapter



is the first, written by Lawrence K. Frank of the Josiah Macy Jr. Foundation. It is well worth owning the whole book to have this chapter which covers the basic needs of the child. Anyone who reads it should gain new insight into child growth and development. Section II deals with the practical application in the classroom of principles of mental health. The illustrations cover all ages and grade levels. One of the outstanding chapters of this section is the presentation of some of the problems of adolescent children. In the third and final section, the problem of teacher training is discussed. Paul Misner discusses "In-Service Growth of Teachers." The school administrator who reads this may find help in planning his own in-service programs.

W. Carson Ryan has written the concluding chapter. It deals with pre-service training and teacher growth. This is a scholarly presentation and a fitting climax to the book. He points out that the increasing development of the administrative and "school-keeping" aspects of education have resulted in the loss of some of the most valuable earlier concepts of teacher training, namely, the need to train teachers in knowing and dealing understandingly with children and youth as human beings. This idea was appreciated more than 100 years ago in the earliest days of the American school, but it has been forgotten during the expansion of education into "big business." As recently as four or five years ago Dr. Ryan found that many teacher training institutions failed to appreciate the importance of this concept in the organization of their teacher training courses.

If there is any criticism of this book, it is the criticism that it lacks continuity. This is a weakness which is almost unavoidable in a symposium when there are many contributors. The average classroom teacher may miss the forest for the trees, because of the

slightly different points of view and emphasis given the subject by the various writers. However, there are important chapters which have been previously mentioned, and those who read these ought to secure sufficient appreciation of the mental growth and development of the child and his basic needs to aid in their daily contacts with children. One additional feature of the book which should be helpful to teachers is an annotated bibliography.

GEORGE M. WHEATLEY

#### Wolf Child and Human Child—

*By Arnold Gesell, M.D. New York: Harper, 1941. 107 pp. Price, \$2.00.*

This account of the extraordinary life history of a feral child was reconstructed by the well known American author and student of child development from a diary record of the girl's life in an East Indian orphanage. The gaps in the narrative of the early years of her life were filled in with material obtained by Gesell from the study of many normal children. The biography is interesting because of its mythlike qualities, and because the author has used the story as a vehicle for setting forth in simple terms the facts of growth of the healthy infant and young child which heretofore he has published in technical treatise.

MILTON J. E. SENN

#### Plumbing and Public Health—

*By Arthur B. Cronkright and Arthur P. Miller. Washington, D. C.: U. S. Government Printing Office, 1940. 118 pp. Price, \$3.00.*

*Public Health Bulletin No. 256* is a worth while publication. It should be of interest to public health officials and of value to those immediately responsible for proper installation of plumbing and its appliances. The illustrations and cuts contained are compact and instructive, and the summing up of data on pages 82 and 84 is quite conclusive.

The descriptive matter is concise and worded in such a manner that it should be of great help to those interested in this phase of public health.

The bulletin makes direct reference to the dangers of having plumbing work done by the "handy man," and the disastrous results which may arise from installations made by persons not familiar with the potential hazards of modern appliances. It is doubtful that the public appreciates fully these dangers, or understands the necessity of

having all plumbing work installed by journeymen plumbers under the direct supervision of master plumbers who have kept up to date with the improvements in plumbing practice.

The only criticism which the reviewer has to offer is that the bulletin fails to emphasize the necessity of having municipal plumbing regulations which prohibit dangerous interconnections and siphonable fixtures. Many such interconnections and fixtures now exist.

ERNEST J. SULLIVAN

## BOOKS RECEIVED

MENTAL DISEASE AND SOCIAL WELFARE. By Horatio M. Pollock. Utica: State Hospitals Press, 1941. 237 pp. Price, \$2.00.

INTRODUCTION TO PSYCHOBIOLOGY AND PSYCHIATRY. By Esther Loring Richards. St. Louis: Mosby, 1941. 357 pp. Price, \$2.50.

YOUTH, FAMILY, AND EDUCATION. By Joseph K. Folsom. Washington: American Council on Education, 1941. 299 pp. Price, \$1.75.

THE HEART IN PREGNANCY AND THE CHILD-BEARING AGE. By Burton E. Hamilton and K. Jefferson Thomson. Boston: Little, Brown, 1941. 402 pp. Price, \$5.00.

DIET IN SINUS INFECTIONS AND COLDS. By Egon V. Ullmann. 2d ed. New York: Macmillan, 1941. 185 pp. Price, \$2.00.

THE DOCTOR TAKES A HOLIDAY. An Autobiographical Fragment. By Mary McKibbin-Harper. Cedar Rapids: The Torch Press, 1941. 349 pp. Price, \$2.50.

MEDICAL ASPECT OF BOXING. By Ernst Jokl. Pretoria, So. Africa: Van Schaik's Bookstore, 1941. 251 pp. Price, \$2.00.

FAMILY EXPENDITURES FOR MEDICAL CARE. FIVE REGIONS. Government Printing Office, Washington, 1941. 241 pp. Price, \$ .30.

HELP YOUR DOCTOR TO HELP YOU SERIES: Gastric or Duodenal Ulcer. 53 pp.

Colitis. 30 pp.

Gallstones and Disease of the Gallbladder. 41 pp.

Sick Headache or Migraine. 37 pp.

Food Allergy, 50 pp.

Dr. Walter C. Alvarez, Editor-in-Chief.

New York: Harper, 1941. Price, \$ .95 each.

AIR RAID PRECAUTIONS. In Ten Parts. Reprinted by Permission of the Controller of His Britannic Majesty's Stationery Office. First American Edition. Brooklyn: Chemical Publishing Co., 1941. Price, \$3.00.

PUBLICATIONS OF THE UNIVERSITY OF PENNSYLVANIA BICENTENNIAL CONFERENCE Hypertension. By Harry Goldblatt, *et al.* Price, \$ .50.

Cause and Growth of Cancer. By Louis F. Fieser, *et al.* Price, \$ .75.

Dental Caries. By Henry Klein, *et al.* Price, \$ .50.

Problems of Intestinal Obstruction. By John P. Peters, *et al.* Price, \$ .50.

University of Pennsylvania Press, Philadelphia, Pa., 1941.

THE RELATIONSHIP OF THE FEDERAL GOVERNMENT TO THE EDUCATION OF YOUTH OF SECONDARY-SCHOOL AGE. Washington: National Association of Secondary School Principals, 1941. 24 pp. Price, 5¢ to 10¢ depending upon number ordered.

PERSONAL PROBLEMS OF EVERYDAY LIFE. PRACTICAL ASPECTS OF MENTAL HYGIENE. By Lee Edward Travis and Dorothy Walter Baruch. New York: Appleton-Century, 1941. 392 pp. Price, \$2.75.

TEXTBOOKS OF DIETETICS. By L. S. P. Davidson and Ian A. Anderson. New York: Hoeber, 1941. 324 pp. Price, \$4.25.

PUBLIC WORKS ENGINEERS' YEARBOOK 1941. American Public Works Association, Chicago, 1941. 404 pp. Price, \$3.50.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

**The Last Step**—Finding unsuspected tuberculosis is a major public health responsibility. Competent fluoroscopy, supplemented by x-ray photography is a reliable method of finding tuberculosis. That in brief is the gist of this persuasive paper.

BLOCK, R. G. Case-Finding In Tuberculosis. *Am. Rev. Tuberc.* 43, 2:213 (Feb.), 1941.

**Proof That It Can Be Done**—Health education can change eating habits even in "Little Italy." Children in homes where the instruction was given ate more milk, eggs, fruit, and vegetables than in the control households.

BOVEE, D. L., and DOWNES, J. The Influence of Nutrition Education in Families of the Mulberry Area of New York City. *Milbank Quart.* 19, 2:121 (Apr.), 1941.

**Poor Housing and Illness Rates**—Here is pretty convincing evidence of what you have assumed, that when more than one and a half persons are crowded in one room disabling illness is greater than in households in which there are one or less persons per room. Pneumonia rates increase strikingly with crowding. Digestive disorders are less frequent in families which can boast of inside toilets. Despite all the other social factors that cannot be ignored, there is undoubtedly a broad association between housing and health.

BETTS, R. H. Illness and Accidents among Persons Living under Different Housing Conditions. *Pub. Health Rep.* 56, 13:602 (Mar. 28), 1941.

**Even the Title Is Excellent**—Addressed to health workers concerned with maternal hygiene, this forceful re-

minder that they neglect their golden chances to instruct their patients applies equally to all the rest of us. "What goes on in the minds of these (expectant) mothers as they sit on the hard (clinic) benches?" the writer asks. You will agree that her speculations are pointed as well as barbed.

CORBIN, H. Writing on the Wall. *Med. Woman's J.* 48, 3:88 (Mar.), 1941.

**War and Pestilence**—Although experience from the past cannot be depended upon to provide infallible rules for victory in future military operations, much can be learned from this revealing summary of health hazards in past wars and the present one.

COUNCELL, C. E. War and Infectious Disease. *Pub. Health Rep.* 56, 12:547 (Mar. 21), 1941.

**Fluorine vs. Dental Caries, Again**—In four Chicago suburbs having water supplies with traces of fluorine, the children were found to have incidence rates of dental caries varying from 252 to 323. In three suburbs with fluorine-free water the rates varied from 673 to 810. Considering that the population groups are much alike one would be hard put to it to ascribe these differences to anything other than water supply.

DEAN, H. T., *et al.* Domestic Water and Dental Caries. *Pub. Health Rep.* 56, 15:761 (Apr. 11), 1941.

**Instead of "Health Insurance"**—Development of group medicine, extension of voluntary prepayment plans for hospital and medical care, voluntary cash indemnity insurance to meet sickness costs; all these, supplementing adequate public health services and

public care for the indigent should prove the basis for a satisfactory American health plan.

EMERSON, H. *The Question of Socialized Medicine*. New York State J. Med. 41, 7:698 (Apr.), 1941.

**Seeing's Believing**—Some of us may have seen the illuminated sneeze so many times that the whole idea is becoming a bit of a bore (it will help if you will remind yourself that the picture comes as startling news to the lay viewers whenever it is shown or published). Here, however, you can compare the full-blown sneeze with an apologetic cough or the mere pronunciation of the letter "f." How many droplets per "f" would you expect?

JENNISON, M. W., and TURNER, C. E. *The Origin of Droplet and Air Borne Infections*. Trained Nurse & Hosp. Rev. 106, 3:186 (Mar.), 1941.

**Where Explosives Are Made**—Many public health administrators are facing, or will have to face, new health hazards arising from our rapidly expanding defense industries. One instance of what our contemporaries north of us are doing to anticipate their difficulties is this brief description of a method to measure T.N.T. in work room atmospheres.

KAY, K. *Determination of T.N.T. (2, 4, 6—Trinitrotoluene) in the Air*. Canad. J. Research. 19, 3:86 (Mar.), 1941.

**About Tuberculosis**—Only two pages long, this excellent paper is packed with what every single health worker should know. What the author was taught about tuberculosis twenty-five years ago, and the modern concept of case finding and care are related in vivid contrast.

KING, D. S. *A Quarter-Century of Progress*. Bulletin (Mat. Tuberc. Assoc.). 27, 4:55 (Apr.), 1941.

**It's Always Later Than You Think**—During what years of their lives are pioneers in medicine and pub-

lic health most likely to make their greatest contributions to scientific advancement? This is the question posed. It is almost unthinkable that any one of us would not want to know the answer. I hope that the bald retelling here that the production peak is at ages 35-39 will not lessen your desire to read the whole paper, which you should for there is much more to be found in it.

LEHMAN, H. C. *The Creative Years: Medicine, Surgery, and Certain Related Fields*. Scient. Monthly. 52, 5:450 (May), 1941.

**Promoting Population Increase**—Unsuccessful attempts by certain European countries to raise the birth rate by piddling allowances made to fecund families are reported upon. In Germany the birth rate increase is attributed to the new confidence of the German people and their desire to help the revolution. Spiritual, rather than economic factors count most.

McCLEARY, G. F. *The Pre-War European Population Policies*. Milbank Quart. 19, 2:105 (Apr.), 1941.

**More Than 60 Per Cent are Females**—All the statistics about cancer incidence, prevalence, and distribution that one could possibly want to know seem to have been set forth in this study of the 5,833 cancer cases reported in Detroit in 1937. Useful graphs and tables are appended.

McDOWELL, A. J. *The Incidence of Cancer in Detroit and Wayne County, Michigan, 1937*. Pub. Health Rep. 56, 14:703 (Apr. 4), 1941.

**Yes, It Can Happen Here**—When you hear bombs falling in your neighborhood, forget your dignity and fall flat. This bit of advice is thrown in for good measure in a discussion of British experience in giving first aid to those injured in air raids.

MITCHNER, P. H. *General Principles of Treatment of Air-Raid Casualties*. Brit. M. J. No. 4182: 309 (Mar. 1), 1941.

**For Your Rapidly Graying Hairs**  
—That there is an anti-gray-hair vitamin among the big family of "B's" can be shown, but it is hard to identify and expensive to put back in our super-refined, then "enriched" food stuffs. Will the hair-darkener vitamin prevent premature aging? That question remains to be answered.

MORGAN, A. F. *Vitamins and Senescence*. *Scient. Monthly*. 52, 5:416 (May), 1941.

**Like the Daring Young Man**—Do you know what an aerosol is? If you do not, perhaps this study will be news to you. If, in a chamber of gently moving air, a culture of a pathogenic organism is sprayed, plates exposed to air samples at intervals up to an hour or more will show numerous colonies. But if certain glycol compounds are sprayed as a very fine mist after the organisms are introduced the test plates remain sterile. To get a true picture of the control methods employed you must read the item.

ROBERTSON, O. H., *et al.* *Sterilization of Air by Certain Glycols Employed as Aerosols*. *Science*. 98, 2409:213 (Feb. 28), 1941.

**All That's New in Sewage Treatment**—Does your work call for knowledge about the latest word in industrial waste treatment, the sanitary improvement of streams, or the fundamental principles of sludge removal and digestion? Then here you will find all the important new papers—250 of them—summarized for your benefit.

RUDOLFS, W., *et al.* *A Critical Review of*

the Literature of 1940 on Sewage and Waste Treatment and Stream Pollution. *Sewage Works J.* 13, 2:187 (Mar.), 1941.

**Scientific News Item to Remember**—Half the children in certain institutions in New Jersey and vicinity are being vaccinated with measles virus grown on chick embryos. The other children will serve as controls. The vaccine will not be released for general use until the extent and length of immunity are known, though it may possibly be given a trial in the army.

STAFFORD, J. *Anti-Measles Vaccine*. *Science (Supplement)*. 93, 2411:9 (Mar. 14), 1941.

**Progress in Cancer Research**—Persistent, comprehensive study of dietary and chemical therapeutic measures may some day give us the means to save thousands of lives from cancer, this eminent researcher believes.

VOEGLIN, C. *Possibilities of Improved Therapy for Cancer Patients*. *J.A.M.A.* 116, 14:1491 (Apr. 5), 1941.

**Children with Rheumatic Hearts**—Adequate bed care for children with acute rheumatism and rheumatic heart disease is costly in time, effort, and facilities. A 5 year demonstration proved that it is practical on a community-wide basis. Is it worth while? How many lives were saved? Tentative answers are found in the several papers of this stimulating symposium.

WHITE, P. D., *et al.* *The Convalescent Care of Children with Heart Disease Due to Rheumatic Fever (and three related papers)*. *New. Eng. J. Med.* 224, 15:627 (Apr. 10), 1941.

## ASSOCIATION NEWS

### The 70th Annual Meeting

*L. Van D. Chandler, Chairman, Publicity Committee*

“**S**ET sail for Atlantic City for the 70th Annual Meeting of the American Public Health Association” is the slogan the New Jersey Local Committee is using on its letterhead, and it is good advice.

This important anniversary takes place from October 14 to 17. The city with the Atlantic Ocean as its front yard is never more beautiful than at that time of year. Lively, but not too crowded, sunny, warm and bright, the famous Boardwalk will lure delegates to brisk early morning walks, lazy noonday strolls, and chair-rides at sunset.

Atlantic City is situated upon an island five miles out from the mainland of southern New Jersey. Separated from blue water only by a narrow shelf of curving beach and the Boardwalk, it rises to make a skyline that is one of America's dramatic architectural spectacles. Its impressive hotels seem to stand at the edge of the surf, their loftiness accented against a smokeless sky.

In the daylight there is color everywhere, in the sea, the sky, the sands, and in the buildings. At night, the Boardwalk and the great piers stretching seaward are outlined with electric lights. Beauty of natural setting, excellence of hotel and meeting room facilities, and easy accessibility make Atlantic City one of the world's most popular convention cities.

#### HOTELS

Association members indicate by the room reservations they have already made, how they are succumbing to the siren call of Atlantic City. The city itself, the promises of the Program Committee so far as scientific sessions are concerned, and the pledges of the New Jersey Committee in regard to entertainment, make a combination so tempting, no one with imagination could resist. The Convention Bureau reports nearly 1,000 reservations in the Hotel Traymore and nearby hotels which are residence headquarters.

A map appears on page 654 showing the location of Boardwalk and Avenue Hotels in relation to Convention Hall, where all scientific sessions will be held. A reservation blank is provided. This should be filled in promptly and sent to the Housing Committee, 16 Central Pier, Atlantic City, N. J.

#### RAILROAD RATES

Elsewhere in the *Journal*, railroad fares from principal cities to Atlantic City are quoted. There are no convention rates in effect. Local ticket agents should be consulted about routings.

#### LOCAL COMMITTEE

The Executive Secretary of the New Jersey Committee, Dr. Samuel L. Salasin, announces the appointment of officers and subcommittee chairmen and secretaries as follows:

## THE NEW JERSEY COMMITTEE

*Honorary Chairmen*

ROBERT C. CLOTHIER  
GOVERNOR CHARLES EDISON  
DR. CHARLES H. ELLIOTT  
COMMISSIONER WILLIAM J. ELLIS  
DR. J. LYNN MAHAFFEY

*Chairman*

Hon. Thomas D. Taggart, Jr.

*Finance Committee*

Arthur S. Chenoweth, *Chairman*  
Frank J. Osborne, *Vice-Chairman*

*Entertainment Committee*

Dr. William J. Carrington, *Chairman*  
Charles H. Eastwood, *Vice-Chairman*

*Scientific Trips Committee*

Dr. David Allman, *Chairman*  
Cameron Freas, *Vice-Chairman*

*Meeting Rooms Committee*

Maurice Brunstein, *Chairman*  
Nellie McGurran, *Vice-Chairman*

*Transportation Committee*

Harold Feyl, *Chairman*  
R. C. Errickson, *Vice-Chairman*

*Executive Secretary*

Samuel Salasin, M.D.

*Reception Committee*

Major William F. Casey, *Chairman*  
William J. Orchard, *Vice-Chairman*

*Ladies Entertainment Committee*

Mrs. Samuel L. Salasin, *Chairman*  
Mrs. J. Lynn Mahaffey, *Vice-Chairman*

*Attendance Committee*

Richard Swift, *Chairman*  
Dr. Jos. R. Morrow, *Vice-Chairman*

*Publicity Committee*

L. Van D. Chandler, *Chairman*  
L. A. Wilkes, *Vice-Chairman*

*Registration Committee*

Dr. Clarence L. Andrews, *Chairman*  
Andrew J. Krog, *Vice-Chairman*

*Hotel Committee*

A. J. Morgan  
Florence McCann

## THE SCIENTIFIC PROGRAM

The 70th Annual Meeting is taking place in one of the most eventful years in the life of anyone now living. It would be impossible for portentous national and international affairs not to affect the choice of speakers and subjects for the General and Section sessions. The Association last year adopted a resolution pledging to the national defense the united support of its members in whatever fields they may be called to serve, and rededicating itself to the maintenance of health in a free people. The program for the Atlantic City Annual Meeting is being developed in this spirit. While it men-

tions the words "national defense" only occasionally, its direction naturally tends toward the new problems posed by the defense effort. Nevertheless, "Health for Three-Thirds of a Nation," whether in emergent or ordinary times, still remains the underlying motive of the Association's activities and therefore of its Annual Meeting program.

The 70th Annual Meeting officially opens on Tuesday morning, October 14, at 9:30. The ten Sections of the Association have a full quota of meetings beginning then and continuing through Friday afternoon, October 17. At least four General Sessions will take

place during the four days. Throughout, there will be joint meetings with two or more Sections participating, and in collaboration with such organizations as the American School Health Association, the Conference of State Sanitary Engineers, the National Organization for Public Health Nursing, and the New Jersey Section of the American Water Works Association.

The Eighth Institute on Health Education will be held on Sunday and Monday preceding the official opening of the meeting, and will conclude with an open session on Tuesday morning. The Committee on Administrative Practice sponsors an open session on Monday, and meetings are scheduled for that day of the Conference of State Laboratory Directors, the Conference of State Sanitary Engineers, the Conference of Municipal Public Health Engineers, the American School Health Association, the Association of Women in Public Health, the New Jersey Health and

Sanitary Association, the International Society of Medical Health Officers, and the State Directors of Health Education. In addition, numerous Association committee meetings are being planned for Monday, as well as meetings of the Executive Board, the Governing Council, and of special groups assembled by related organizations.

The Health Exhibit opens at noon on Monday to take advantage of the presence of several hundred early arrivals. Registration Headquarters will open at noon on Sunday, because it is believed that many people will elect to spend the week-end in Atlantic City, whether or not they attend any of the advance meetings, and it will be convenient for them to register early, obtain the official program, and leisurely plan their schedules for the week.

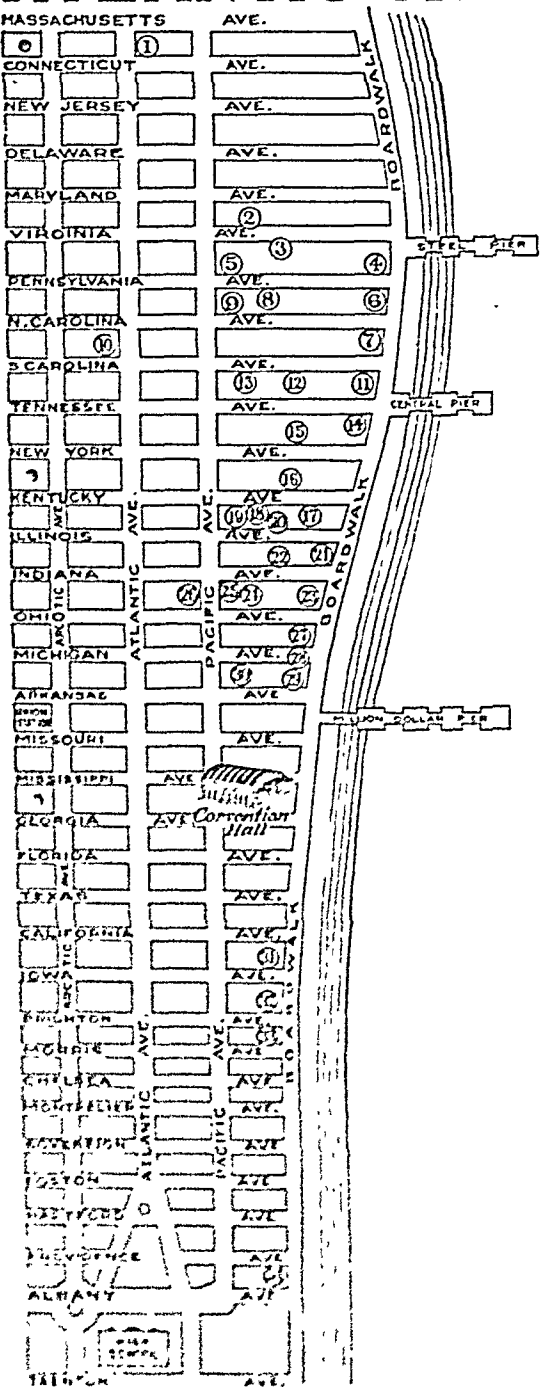
The August *Journal* will contain full details about the advance meetings on Sunday and Monday, and about Section and General Sessions.



RATES QUOTED BY ATLANTIC CITY HOTELS  
Seventieth Annual Meeting, October 14 to 17, 1941  
AMERICAN PUBLIC HEALTH ASSOCIATION

ALL RATES QUOTED ARE FOR ROOMS WITH BATH ON EUROPEAN PLAN  
(Rooms without Bath and Two Bedrooms with Bath Between Are Available in Some Hotels)

ATLANTIC CITY



Boardwalk Hotels

Key No.	Single Rooms with Bath	Double Rooms with Bath
32 Ambassador ..	\$3-\$4-\$5-\$6	\$6-\$7-\$8-\$10
22 Brighton ....	\$3-\$4-\$5	\$5-\$6-\$7-\$8
6-7 Chalfonte-Haddon Hall	\$3-\$4-\$5-\$6-\$8	\$6-\$8-\$10-\$12
33 Chelsea .....	\$3-\$4-\$5	\$5-\$6-\$7-\$8
28 Dennis .....	\$3.50-\$4-\$5-\$6	\$6-\$7-\$8-\$9-\$10
14 Knickerbocker	\$3-\$3.50-\$4	\$5-\$6-\$7
11 New Belmont	\$2.50-\$3	\$4-\$5-\$6-\$7
34 President ...	\$3	\$5.50-\$7-\$8
31 Ritz - Carlton	\$3-\$3.50-\$4-\$5	\$5-\$6-\$7-\$8-\$10
4 Seaside .....	\$3-\$3.50-\$4	\$5-\$6-\$7
29 Shelburne ...	\$4-\$5-\$6-\$8-\$10	\$6-\$7-\$8-\$10-\$12
21 Traymore ...		\$8-\$10-\$12

All hotels offer Suites and DeLuxe Rooms.  
Rates can be ascertained by direct correspondence with the individual hotels.

Avenue Hotels

Key No.	Single Rooms with Bath	Double Rooms with Bath
30 Arlington ...	\$3.50-\$4	\$5-\$6
19 Byron .....		\$4.50-\$5-\$5.50-\$6
8 Colton Manor	\$3-\$3.50-\$4-\$5	\$5-\$6-\$7-\$8-\$9
25 Crillon* ....		\$5-\$6
26 Eastbourne ..		\$4.50-\$5-\$6
15 Flanders ....	\$3-\$4	\$5
24 Glaslyn-Chatham .....		\$5
17 Jefferson ....	\$3-\$3.50	\$5-\$6
18 Kentucky ...	\$2.50	\$4
9 Lafayette ...	\$3-\$3.50-\$4	\$5-\$6-\$7
20 Madison ...	\$3-\$3.50-\$4	\$5-\$6-\$7
16 Monticello ..		\$5
3 Morton ...	\$2.50-\$3-\$3.50-\$4	\$5-\$6-\$7
19 Penn-Atlantic	\$3	\$5
13 Princess ...	\$2.50	\$4
Runnymede	\$2.50-\$3-\$3.50-\$4	\$4-\$5-\$6-\$7
12 Senator .....	\$3-\$3.50-\$4	\$5-\$6-\$7

\* Breakfast Included

MORE than 1,000 reservations have already been made in the headquarters hotel—The Traymore—and other nearby hotels. Only double rooms at \$8.00 and up remain in the Traymore. The lower priced accommodations in all hotels naturally go first. Reservations should be made promptly on the form printed below. Please send it to the Hotel Committee, 16 Central Pier, Atlantic City, N. J., and *not* to the Association office.

Between Convention Hall and the Traymore, the Boardwalk hotels where rooms are still available are the Shelburne and the Dennis. Beyond the Traymore, the Knickerbocker, Belmont, Chalfonte-Haddon Hall, and Seaside all offer excellent accommodations. Beyond Convention Hall, there are the Ritz-Carlton, Ambassador, and Chelsea Hotels. Do not overlook the Avenue hotels. Some are removed only a little distance from the Boardwalk, which to many people is no disadvantage.

(Cut off on this line and mail to Mr. Morgan)

Aaron H. Haskin, M.D., 80 Millington Ave.,  
Newark, N. J., Medical Receiving Officer,  
Health Dept.

Kenneth W. Haworth, M.D., 106 East Second,  
Pratt, Kan., Pratt County Health Officer

William J. Kucewicz, M.D., 41 Pearl St.,  
Thompsonville, Conn., Town of Enfield  
Health Officer

James C. MacPherson, M.D., Rosebud Health  
District, Didsbury, Alberta, Canada, Medi-  
cal Officer of Health

Ulpiano Madrid-Leon, M.D., 715 Forest Plaza  
Apts., Ann Harbor, Mich., Student of Pub-  
lic Health, Univ. of Michigan

James McClung, M.D., Richwood, W. Va.,  
City Health Officer

Robert G. Mossman, M.D., City Hall,  
Youngstown, Ohio, Commissioner of Health

Bernard L. Toothaker, M.D., 9 Maywood  
Road, New Rochelle, N. Y., Clinician,  
Venereal Disease Division, Dept. of Health

Hugh J. Wittwer, M.D., 5940 Marwinette, St.  
Louis, Mo., Diagnostician, Health Dept.

#### Laboratory Section

Jon Bjornsson, M.D., 619 N. Washington St.,  
Baltimore, Md., Student, Johns Hopkins  
School of Hygiene and Public Health

C. Robert Blake, B.A., St. James Hospital  
Laboratory, Butte, Mont., Laboratory  
Technician

Jane I. Burns, Ph.D., Municipal Courts Bldg.,  
Room 12, St. Louis, Mo., Chemist, Division  
of Health

George M. Cameron, Ph.D., 2119 Ashwood  
Ave., Nashville, Tenn., Acting Director of  
Laboratories, State Health Dept.

Ira G. Collins, A.M., 1001 South Mill, Col-  
fax, Wash., Director of Laboratory, Whit-  
man County Health Dept.

William J. Firth, 5757 Calumet Ave., Ham-  
mond, Ind., City Chemist and Bacteriologist,  
Health Dept.

#### Vital Statistics Section

Nora Barber, 404 City Hall, Fort Worth,  
Tex., Registrar of Vital Statistics, Dept. of  
Public Health

James F. Donohue, B.S., U. S. Public Health  
Service Bldg., V. D. Div., 19th & Constitu-  
tion Ave., N. W., Washington, D. C.,  
Statistician

William F. Elkin, M.S., 217 North Ingalls,  
Ann Arbor, Mich., Student, Univ. of  
Michigan

Dorothy E. Wiesner, 639 Lorraine St.,  
Mamaroneck, N. Y., Statistician, National  
Organization for Public Health Nursing

#### Engineering Section

Herbert M. Decker, A.B., 159-02 84th Ave.,  
Jamaica, N. Y., Student, School of Public  
Health, Univ. of North Carolina

John Veenstra, B.S., 526 S. Division, Ann  
Arbor, Mich., Student, Univ. of Michigan

#### Industrial Hygiene Section

John J. Ferry, B.S. in Ch.E., 1 Madison Ave.,  
New York, N. Y., Assistant Chemist, Met-  
ropolitan Life Insurance Co.

Peter H. Gatte, B.S., Republic Steel Corp.,  
Medical Laboratory, Youngstown, Ohio,  
Industrial Hygiene Chemist

Irving J. King, M.D., 210 Riverway, Boston,  
Mass., Student, Harvard School of Public  
Health

Peter A. Petrick, 25 North Columbus, Mount  
Vernon, N. Y., Technician, Metropolitan  
Life Insurance Co.

#### Food and Nutrition Section

Adelia M. Beeuwkes, B.S., University Health  
Service, Ann Arbor, Mich., Dietitian and  
Instructor in Nutrition

John S. Goldsmith, M.S., John H. Dulany &  
Son, Exmore, Va., Bacteriologist (Frozen  
and Canned Food)

Ruth M. Kahn, B.S., 507 S. Euclid, St. Louis, Mo., Chief of Food Clinic, Washington Univ. Medical School Clinics

Clifford R. Plumb, Dept. of Agriculture and Markets, State Office Bldg., Albany, N. Y., Director, Bureau of Food Control

#### *Maternal and Child Health Section*

Sant Ram Dulvy, M.B., LL.B., Field Hospital, A. I. O. C. Ltd., Masjid 1 Suleiman, S. Iran, Consulting Physician

William Fraden, M.D., 2710 Morris Ave., Bronx, N. Y., School Physician, City Health Dept.

Beatrice Hall, A.B., U. S. Children's Bureau, Washington, D.C., Medical Social Consultant

Orvis S. Hoag, D.D.S., State Dept. of Public Health, Springfield, Ill., Assistant Dentist

#### *Public Health Education Section*

Anna C. Bell, P. O. Box 124, Silverton, Colo., District Vice-Commander, Women's Field Army, American Society for the Control of Cancer

Laurentine B. Collins, M.A., 467 West Hancock, Detroit Mich., Supervisor of Health Education, Detroit Public Schools

Winton E. Gambrell, Ph.D., 517 North Wolfe St., Baltimore, Md., Assistant Professor of Bacteriology, Emory Univ. Medical School (Georgia)

Lyman F. Huffman, M.D., 1817 Republic Bldg., Cleveland, Ohio, Chairman, Public Health Committee, Cleveland Academy of Medicine, and Member, Ohio Public Health Council

Johanne U. Johnson, M.S.P.H., 315 S. Division St., Ann Harbor, Mich., Student, Univ. of Michigan

Kathleen Kumler, A.B., 2575 Cadillac Blvd., Detroit, Mich., Graduate Student in Public Health, Univ. of Michigan

Sister Mary Marcella Rial, R.N., Ph.B., 326 Ingalls St., Ann Arbor, Mich., Student, Univ. of Michigan

#### *Public Health Nursing Section*

Gertrude M. Lee, B.S., Heron, Sanders County, Mont., County Nurse

Katherine H. Moffett, Chico City Schools, Butte County, Chico, Calif., Nurse, Board of Education

Cecilia A. Robrecht, R.N., R.F.D. 1, Triadelphia, W. Va., Senior Nurse, City-County Health Dept.

Eva V. Woerth, R.N., B.S., Health Dept., City Hall, Sioux City, Iowa, Supervisor, Public Health Nursing, Woodbury County Health Unit

#### *Epidemiology Section*

John J. Boehrer, M.D., 4853 Colfax Ave., South, Minneapolis, Minn., Physician, Students Health Service, and Instructor in Preventive Medicine and Public Health, Univ. of Minnesota

Berwyn F. Mattison, M.D., C.M., 242 George St., Fort Ann, N. Y., Physician-in-training, State Dept. of Health

Lieut. John W. Regan, M.C., U.S.A., Carlisle Barracks, Carlisle, Pa., Instructor, Military Sanitation, Medical Field Service School

Alice B. Tobler, M.D., 615 No. Wolfe St., Baltimore, Md., Student, Johns Hopkins School of Hygiene and Public Health

#### *Unaffiliated*

B. Franklin Blotz., M.D., Rocky Ford, Colo.

William Kotler, B.S., 2429 East 17th St., Brooklyn, N. Y., Student, DeLamar Institute of Public Health, Columbia Univ.

Gottlieb M. Rohde, Jr., 2938 Smallman St., Pittsburgh, Pa., Advertising Manager, Ruud Manufacturing Co.

#### CLOSING DATE FOR SUBMITTING FELLOWSHIP APPLICATIONS

MEMBERS who may be interested in applying for Fellowship in the A.P.H.A. are hereby advised that Fellowship applications should be received not later than August 1. to insure consideration at the 70th Annual Meeting.

## EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

### POSITIONS AVAILABLE

Director of County Health Unit, large southern metropolitan area over 200,000, duties to include the direction of complete generalized program. Applicant must have M.D., M.P.H., with satisfactory experience in administration and technical phase of public health work. Salary dependent upon experience and training. Opportunity for advancement assured. Box W, A.P.H.A.

Sanitary Chemist for sewage laboratory in Eastern city. Salary \$2,000. Graduate preferred. Write Box V, Employment Service, A.P.H.A.

Bacteriologist, Alexandria, Va., City Department of Health. Milk, water, serological, and general examinations. Salary \$1,200 to \$1,800 according to training and experience. Apply to W. A. Browne, M.D., Health Officer.

Physician with public health training to serve as full-time county health officer in rural South Atlantic area. Salary \$3,600 to \$4,000. Write Box C, Employment Service, A.P.H.A.

Public Health Nurse. General nurse for Alexandria, Va., City Health Department. Must be a graduate of an accredited hospital with special training and experience in public health. Salary \$1,620 to

\$1,800 according to qualifications. Apply to W. A. Browne, M.D., Health Officer.

County Public Health Nurses for New Mexico. Must have 4 months' post-graduate instruction under one of the recognized public health nursing courses and one year's experience. Must drive and have a car. Address inquiry to State Health Department, Santa Fe, N. M.

### U. S. CIVIL SERVICE COMMISSION

The Commission has announced that applications will be received for positions as Senior Medical Officer (\$4,600), Medical Officer (\$3,800), and Associate Medical Officer (\$3,200), for appointments in the Public Health Service, with the Food and Drug Administration, Veteran's Administration, and the Indian Service. Forms for application may be obtained from the U. S. Civil Service Commission, Washington.

The Commission also announces that applications may be filed for the positions of Public Health Nurse (\$2,000) and Graduate Nurse, general staff duty (\$1,800) in the Indian Field Service, including Alaska. Forms may be obtained from the U. S. Civil Service Commission, Washington.

### POSITIONS WANTED

#### ADMINISTRATIVE

A physician with M.P.H. from Johns Hopkins 1924, experienced as state director for communicable diseases, as county health officer and as director of field training center, will consider a responsible position with good income. A483

Physician, aged 39, excellent graduate training and experience in public health, specialized in tuberculosis and epidemiology, now employed, will consider position with salary of \$4,500 or better. A473

Physician, aged 44, graduate of Rush Medical, completing work at Johns Hopkins for M.P.H. and experienced as director of rural unit, will consider opening. A480

Experienced physician, graduate University of Illinois, M.P.H. Johns Hopkins 1940, seeks administrative opening suitable to his proven ability. Excellent references. A466

Physician with M.P.H. from Johns Hopkins and 10 years' field experience in responsible position with leading state health department, will consider good opening. A481

Physician, graduate of University of Iowa, candidate for Dr.P.H. at Harvard, seeks good administrative position. A476

Physician, aged 40, M.D. University of Minnesota, C.P.H. and Dr.P.H. Johns Hopkins, experienced in epidemiology and venereal disease control, will consider interesting position. A482

Physician, specialist in maternal and child health. M.D. University of Kansas, M.P.H. Harvard. Excellent background in pediatric residencies, experience in municipal and county health work and as

director of maternal and child health in state health departments. Desires position as director of a state program, as pediatrician, or in school or college health program. A479

Dentist, University of Pittsburgh, D.D.S., M.P.H. University of Pennsylvania 1941, experienced in practice, wishes an administrative position in public health, preferably at state level. M450

#### HEALTH EDUCATION

Director of Health Education, woman. Knows fields of education and health education. National and state experience in organization, supervision, curriculum building and teacher education. Now employed but would consider a change. H495

Young woman with Master's degree in Health Education, Teacher's College, Columbia University, and background of clinical laboratory work and biochemistry, seeks position as health educator in research or as laboratory assistant in public health. H494

Public Health Nurse, M.A. Columbia, experienced in teaching health education and public health nursing. Wishes teaching position in college or university summer of 1941. H472

#### LABORATORY

Laboratory Director. Unusually well qualified and experienced man, aged 41, Ph.D. with training at Michigan, M.I.T. and Maryland, excellent references. Will

consider administrative, teaching or research position in public health. L459

Experienced woman bacteriologist, now employed, graduate Iowa State College 1925, 6 months on Fellowship at Johns Hopkins 1930, wishes position in serology, bacteriology, or research. L458

Experienced bacteriologist, young man of 33, Sc.B. who for several years has been in charge of state laboratory doing public health and diagnostic bacteriology, immunology, and serology, will consider opening. L427

#### SANITARY ENGINEERING

Engineer, aged 38, 3 years' experience as district sanitary supervisor, state department of health, together with work on plumbing, heating and ventilation, will consider position in the plumbing or heating field or state department of health. Prefers middle western or western states. E453

Engineer with good training and experience in water treatment, sewage plant operation and in research, wishes position as superintendent. Can go anywhere. E422

#### STATISTICAL

Public Health Statistician. Young man, M.S.P.H. Michigan, now employed as supervisor of state health project, experienced in medical economic research, epidemiology studies and vital statistics, seeks position in city or state health department in mid-west. S458

#### Advertisement

#### NURSE PLACEMENT SERVICE

Anna L. Tittman, R.N., Executive Director

Suite 512, Willoughby Tower, Michigan and Madison Avenues, Chicago, Ill.

*Professionally sponsored. Approved Bureau of N.O.P.H.N. No registration fee.*

**ADMINISTRATION:** (a) Director V.N.A.; five nurses, growing community, fine opportunities for expansion of service; west coast \$2,500 No. 41-10-2 (b) Director, recently combined and reorganized, official county and urban service; mid-Atlantic; \$2,750-\$3,000. No. 40-2705

**EDUCATION** (a) Director P.H.N. University program of study, Master's degree, substantial background of P.H.N. experience and teaching, \$2,500. No. 41-1256.

**CONSULTATION** (a) Maternity, state wide, South; \$100 plus travel. No. 41-1212 (b) Industrial, state wide, college degree, P.H.N. certificate, generalized experience, industrial experience desired, not required, \$2,400. No. 41-1121

**SUPERVISION** (a) Field Supervisor, University P.H.N. program of study; Master's degree, P.H.N. certificate, supervisory experience. No. 41-1212 (b) County, official, middle west, \$2,100 plus travel. No. 41-1274 (c) Assistant State

Supervisor, middle west; \$2,400 plus travel. No. 41-1060 (d) Cardiac program; private urban-county; organize program; mid-Atlantic, \$2,100. No. 41-1066.

**SCHOOL** (a) One Nurse; state teachers college; supervise health program, teach one class a quarter, middle west; \$1,800 for school term. No. 41-1211. (b) One Nurse; Board of Education; two elementary schools; mid-Atlantic; \$1,500. No. 41-1112

**ONE NURSE SERVICE.** (a) County; official, generalized service including maternity and home delivery, western mountain; \$1,800. No. 09011. (b) Community, private, small rural community, popular summer resort; \$1,800. No. 41-1269.

**STAFF** (a) Generalized; private; middle west; salary depends on qualifications; No. 08761. (b) Generalized, private; mid-Atlantic; No. 40-1420.

**CAMP** Opportunities open; chiefly north-middle west; salaries vary.

APPLY NOW

## Advertisement

## Opportunities Available

**PUBLIC HEALTH PHYSICIANS**—(a) Industrial hygienist to take charge state program; \$300, plus travel allowance; South. (b) Public health physician qualified for teaching of medical bacteriology, immunology and public health laboratory methods; university medical school; ability to conduct independent research, record of scientific contributions to literature important; \$4,000. (c) To head board of health in southern Ohio town; will be responsible for organizing and directing complete health program. (d) County health physicians to take charge of districts comprised of from three to five counties; \$3,850, travel allowance; Far West. (e) To assume charge of school physician's duties under supervision municipal health department; city of 300,000; about \$3,600. PH 6-1, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**STUDENT HEALTH PHYSICIANS**—(a) Old established college in small midwestern town; modern health service building equipped with x-ray, diathermy machine, audiometer, metabolism unit, eye testing equipment; physician who has completed internship eligible; (b) Physician to direct health service in mid-western university with nearly 1,500 students enrolled; attractive stipend. (c) To assume responsibility for medical needs of students and faculty in small California college; duties will consume about one-half physician's time; private practice permitted; school appointment carries remuneration of about \$2,000. PH 6-2, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSES**—(a) Certified public health nurse for municipal health department; 18 nurses on staff; opportunity to take additional college courses if desired; midwestern metropolis. (b) Public health nurse with minimum Bachelor's degree; health education department of eastern school; duties include clinic work, care of children in infirmary, teaching health classes; living conditions excellent; September-June; Christmas and Easter vacations total 3 weeks. (c) Educational director for large state organization; academic and public health degrees required; about \$175. (d) Several for state health nursing program including maternal and child hygiene, communicable disease control, school nursing, crippled children's follow-up, tuberculosis and some venereal disease follow-up; \$135-\$160. PH6-3, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**BACTERIOLOGIST**—Well-qualified bacteriologist for large hospital, Chicago area; duties begin about September; \$150, increasing. PH6-4, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**LABORATORY TECHNICIAN**—Thoroughly experienced technician to serve as substitute in three county laboratories for 18 weeks, immediately; possibility of permanent appointment at \$1,800 following completion of relief service; East. PH6-5, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

## Situations Wanted

**PUBLIC HEALTH PHYSICIAN** — Certified; bachelor's and medical degrees from state university; C.P.H., Johns Hopkins; 4 years, director student health service, state university; 5 years, executive position with state health department; PH6-6, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**PUBLIC HEALTH NURSE EXECUTIVE**—B.S. in Nursing Education; M.S. in Health Edu-

cation; certificate in Public Health Nursing; record of successful executive experience in public health field. PH 6-7, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

**BACTERIOLOGIST**—A.B., Ph.D., state university; 6 years, university laboratory of animal pathology; 4 years, parasitologist, state department public health. PH6-8, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

## THE NEW YORK MEDICAL EXCHANGE

Public health physician, age 33, Protestant, P.G. courses in public health, five years' experience with a southern state board of health, excellent references, would consider foreign or domestic ap-

pointment, not liable for military service if he remains in public health. For further particulars, write Patricia Edgerly, Director, New York Medical Exchange, 489 Fifth Avenue, New York, N. Y.

## NEWS FROM THE FIELD

### TROPICAL MEDICINE—PUERTO RICO

THE director of the School of Tropical Medicine of the University of Puerto Rico (under the auspices of Columbia University). George W. Bachman, Ph.D., has reported activities of the school's 14th year. An important event was the establishment of a department of public health, funds for which will be provided by an appropriation under the Social Security Act. Dr. Albert V. Hardy, associate professor of epidemiology at the DeLamar Institute of Public Health, Columbia University, was assigned as the first executive officer of the new department to initiate its program.

After 3 years of reconstruction, the new University Hospital was opened early in the year. The outpatient department was the most important activity of the year under review, 20,077 persons having called for treatment. A new library building, financed by the Puerto Rico Reconstruction Administration, has been completed and a recent grant of \$13,500 from the Carnegie Corporation of New York will provide for equipment.

New quarters are under construction for a department of physiology, which is to be developed under the direction of Magnus I. Gregersen, Ph.D., head of the department of physiology at Columbia University, College of Physicians and Surgeons, New York. Dr. Harry S. Mustard, director of the DeLamar Institute, spent several weeks at the School of Tropical Medicine in January in connection with the new school of public health.

### CONNECTICUT PUBLIC HEALTH ASSOCIATION

THE Connecticut Public Health Association held its annual spring meeting in Bridgeport on April 16. A

well rounded program was presented. The health officers and public health nurses sat in separate sessions in the morning and were addressed by members of their respective groups on various phases of their work, while the sanitary inspectors made a field trip which included visits to housing projects under construction, sewage and refuse disposal plants, and pasteurizing plants.

In the afternoon a joint meeting of all the groups representing the Connecticut Public Health Association was addressed by several speakers on interesting and timely subjects.

The following officers were selected:

*President*—Richard O'B. Shea, M.D., Bridgeport

*President-Elect*—Paul H. Brown, M.D., Stamford

*Vice-President*—Alfred Burgdorf, M.D., Hartford

*Secretary-Treasurer*—M. L. Palmieri, M.D., Middletown

*Representative to the A.P.H.A. Governing Council*—Joseph I. Linde, M.D., New Haven

*Alternate Representative to the A.P.H.A. Governing Council*—Millard Knowlton, M.D., Hartford

### PROGRESSIVE EDUCATION ASSOCIATION

THE International Conference of the New Education Fellowship will be held at the University of Michigan, July 6 to 12, 1941. Sally Lucas Jean, Executive Secretary of the Health Section, World Federation of Education Associations, is organizing health education study groups and a general health session covering all phases of the school health program. The chairman for the general session will be Clair E. Turner, Dr.P.H., Professor of Biology and Public Health, Massachusetts Institute of Technology. The subject chosen for this session is: "The Application of the Psychology of Progressive Education to the Field of Health, and

the Contributions of Health Education to Progressive Education." The Progressive Education Association is the United States section of the New Education Fellowship, and the coming International Conference at Ann Arbor will be the first Fellowship conference to be held on the mainland of this country. Two earlier meetings in this hemisphere took place at Mexico City in 1935, and at Honolulu in 1938, while other conferences were conducted in different countries in Europe.

#### NATIONAL TECHNOLOGICAL CIVIL PROTECTION COMMITTEE

A LIMITED number of copies of a much discussed and important release of the National Technological Civil Protection Committee have come into the possession of the Association. This should be of great interest to health officers and engineers. Several in both classifications who have seen it say it is the most interesting document they have had in their hands for a long time. It reports comments of American observers in Britain on what is happening there to public utilities and health services under bombings.

The release is not generally available and copies will be sent to readers who request them as long as the supply lasts.

#### INFANTILE PARALYSIS

THE National Foundation for Infantile Paralysis announces the publication of a Spanish translation of the pamphlet *The Nursing Care of Patients with Infantile Paralysis*, by Jessie L. Stevenson, R.N., Consultant in Orthopedic Nursing, National Organization for Public Health Nursing. This pamphlet, illustrated by line drawings, was prepared by the National Organization for Public Health Nursing for the National Foundation for Infantile Paralysis as a part of a project in orthopedic nursing sponsored by the Foundation. It is intended to assist the

public health nurse and others responsible for home care of patients with infantile paralysis in and following an epidemic. Copies either in Spanish or English are available free upon request from the National Foundation for Infantile Paralysis, 120 Broadway, New York, N. Y.

#### CONGRESS ON OBSTETRICS

THE second American Congress on Obstetrics and Gynecology will be held in St. Louis April 6 to 10, 1942. Dr. Fred L. Adair, professor of obstetrics and gynecology at the University of Chicago, is President of the Congress. This Congress will follow the plan of the conference in Cleveland in 1939 with sectional meetings for the various groups, including nurses, public health workers, administrators, educators and physicians, and general sessions for all members attending the Congress and round tables.

#### CIVILIAN DEFENSE BULLETIN

THE A.P.H.A. has acquired copies of *Bulletin No. 1*, Structures Series, entitled "Protective Construction in Civilian Defense." This was prepared by the War Department with the assistance and advice of other federal agencies and is issued by the Division of State and Local Cooperation, Office for Emergency Management.

Requests for copies will be honored as long as the supply lasts.

#### UNITED STATES NEEDS PUBLIC HEALTH PERSONNEL FOR EMERGENCY HEALTH AND SANITATION ACTIVITIES

UNDER an Appropriation Act approved March 1, 1941, Dr. Thomas Parran has announced that \$525,000 has been made available to the Public Health Service to assist state and local health authorities in health and sanitation activities. The assistance is to be used in areas adjoining military and naval reservations and in



areas adjoining government and private industrial plants engaged in defense work.

The personnel of the Public Health Service will be supplemented by approximately 250 public health workers to assist the state and local health departments. An orientation or introductory program has been planned by the Service (see *American Journal of Public Health*, May, 1941, page 537). An Advisory Council has been appointed by the Surgeon General consisting of the following:

Milton J. Rosenau, M.D.  
Harry S. Mustard, M.D.  
John Sundwall, M.D.  
W. S. Leathers, M.D.  
Gaylord Anderson, M.D.  
Cecil K. Drinker, M.D.  
Abel Wolman, Dr Eng.  
Ira V. Hiscock, Sc.D.  
A Parker Hitchens, M.D.  
Katharine Tucker, R.N.

The additional personnel needs of the states have been estimated as follows:

55 physicians  
95 engineers  
64 public health nurses  
52 laboratory technicians

It has been estimated that there are more than 100 critical areas over the United States needing sanitation and public health assistance.

The orientation course during May consisted of a class of 52 members about equally divided between physicians, nurses, and engineers. The third and fourth courses are scheduled to start June 2 and July 1, respectively.

#### THE HARD OF HEARING AND THE DEAF

CONRAD G. CELVIG of Santa Monica, Calif., Chairman of the Committee on Legislation of the American Society for the Hard of Hearing, has called attention to a publication now available from the United States Government Printing Office as *House*

*Document 151, A Digest of State Laws affecting the Hard of Hearing and the Deaf, with Supplementary Notes on Administrative Acts, Orders and Policies, 1941.*

This report, prepared by the State Law Index Section of the Legislative Reference Service of the Library of Congress, is published in response to a rising tide of interest in state legislatures in behalf of the hard of hearing. It covers the economic, humanitarian, medical, and educational aspects of the problem.

#### A PROGRESS REPORT FROM THE COMMITTEE TO STUDY THE PUBLIC HEALTH NURSING CURRICULUM

AT the request of Katharine Tucker, R.N., Chairman of the Committee on Public Health Nursing Curriculum, attention is called to a progress report which appeared in the May, 1941, issue of *Public Health Nursing*, pages 311-314.

Miss Tucker points out that at the present time 26 universities or colleges have programs of study approved by the National Organization for Public Health Nursing. Profound changes have taken place in the factors that affect content and method since the standards for the curriculum were last revised. A joint undertaking between the N.O.P.H.N. and the U. S. Public Health Service has been under way since February, 1940, with Mary J. Dunn, R.N., Public Health Nursing Consultant of the Service assigned to the work. The purpose of this committee is defined as to "determine what the public health nurse practitioner needs to know and the best way of providing the knowledge, skills, and attitudes required for optimal public health nursing performance." The committee hopes to realize a curriculum guide for public health nursing that will be flexible rather than hard and fast and that will meet the needs of the present

possibly of the next 4 to 5 years.

Production committees are now at work on units for the curriculum covering maternal health, infant health, pre-school child health, health of the school child, communicable disease control, tuberculosis control, pneumonia, influenza and the common cold, orthopedic and plastic conditions, cancer control, heart conditions, mental conditions, diabetes, oral conditions, nutritional conditions, and industrial health. A unit on venereal disease control has already been prepared.

#### NEW OFFICERS OF ARIZONA PUBLIC HEALTH ASSOCIATION

AT its Annual Meeting held in Phoenix in April the Arizona Public Health Association elected the following officers:

*President*—Robert A. Greene, Ph.D., Tucson

*President-elect*—Lewis H. Howard, M.D., Tucson

*First Vice-President*—Howard L. McMartin, M.D., Phoenix

*Second Vice-President*—Marion E. Stroud, Phoenix

*Secretary*—not yet elected

#### ILLINOIS PUBLIC HEALTH ASSOCIATION

THE first annual Public Health Conference of the Illinois Public Health Association in coöperation with the Cook County Public Health Agencies and the Public Health and Hygiene Section of the Illinois State Medical Society was held in Chicago on May 19 and 20.

The program included a review of the large Manteno State Hospital typhoid fever epidemic, round tables on communicable disease control, on public health problems in military areas, on the rôle of nurses in national defense, on public health dentistry, on community planning in public health, and on tuberculosis as a national health problem.

Technical sessions were held on recent developments in laboratory procedures, on water examinations, on

food poisoning, on insect-borne diseases, and an evaluation of the relationship of poliomyelitis to sanitation.

More than 300 persons were registered. The Illinois Public Health Association voted to apply for affiliation with the American Public Health Association.

JOHN ROSSLYN EARP, DR.P.H.

DR. JOHN ROSSLYN EARP, former Director of the Bureau of Health of New Mexico and for several years on the staff of the New York State Health Department died May 19, at the age of 50. He was an Englishman by birth, and a naturalized citizen of the United States since 1932. His educational background was of the best: Cambridge: Licentiate of the Royal College of Physicians; Member of the Royal College of Surgeons; and a Doctor of Public Health, the Johns Hopkins University. Thus well prepared, he made unusual contributions in the academic, administrative, and editorial fields of public health. Dr. Earp carried on his work for a period of years under the handicap of serious illness and demonstrated a rare and inspiring courage. He became a member of the A.P.H.A. in 1923 and a Fellow in 1927. He served on the Governing Council from 1934 to 1937.

MATTHIAS NICOLL, JR., M.D.

DR. MATTHIAS NICOLL, JR., Commissioner of Health of New York State from 1923 to 1930 and Health Commissioner of Westchester County from 1930 until his retirement in 1938, died on May 13 at the age of 73. Dr. Nicoll was elected to membership in the Association in 1917, to charter Fellowship in 1922, served as a member of the Governing Council from 1927 to 1930 and as a member of the Executive Board from 1930 to 1933. He was a past president of the State and Provincial Health Authorities of North America.

## PERSONALS

## Central States

HARRY G. HANSON,† formerly of the State Department of Health, Bismarck, N. D., will be Acting Director of the Division of Sanitary Engineering for the North Dakota Health Department during the absence of LLOYD K. CLARK, Director, who has been ordered to a year's active service with the army.

WILLIAM W. KELLY, M.D.,† Green Bay, Wis., was elected President of the State Board of Health at the board's annual meeting recently. DR. STEPHEN CAHANA, Milwaukee, was elected Vice-President and DR. CORNELIUS A. HARPER,† Madison, reelected Secretary.

CAPTAIN R. S. NELLE, Assistant Engineer in the sewerage section of the Illinois state division of sanitary engineering at Springfield, has been called to military service with the Engineering Corps at Fort Lewis, Wash., where he reported April 20.

MILLARD F. SCHAFER, M.D.,† who just completed a postgraduate course at the University of Michigan, Ann Arbor, has been designated Director of the city-county health unit of Colorado Springs and El Paso County, succeeding DR. THOMAS D. MLNSER, who resigned to enter private practice in Trinidad.

HAROLD W. SEFF, M.D., formerly of Bethel, Ohio, has been named Health

Officer of Sumter County, Ala., with offices in Livingston.

## Eastern States

IVOR GRIFFITH, M.D., Dean of Pharmacy at the Philadelphia College of Pharmacy and Science, was elected to the presidency of the institution to succeed DR. WILMER KRUSEN, former Director of Public Health of the City of Philadelphia, who has served as President of the College since 1927.

PAUL D. GUERNSEY † has become Assistant Executive Secretary of the District of Columbia Tuberculosis Association in Washington, having resigned his position with the Buffalo Tuberculosis Association, Buffalo, N. Y.

HENRY VANZILE HYDE, M.D., of Syracuse, N. Y., has been appointed Director of the Bureau of Pneumonia Control of the New York State Department of Health, succeeding DR. EDWARD S. ROGERS \* who has been appointed Assistant Commissioner for Medical Administration. Dr. Hyde is a graduate of Johns Hopkins University Medical School, has been connected with the College of Medicine of Syracuse University, and has actively engaged in medical research.

GEORGE M. LOTT, M.D., has been appointed as Director of the Mental Hygiene Division of the Suffolk County Department of Health, New York.

THE ALPHA  
PHI

---

## The A.P.H.A. Membership Nomination Blank

On page XX of this issue of the *Journal* appears a form to be used by members of the A.P.H.A. in nominating other persons for membership. This blank will be carried in the next few issues and we hope that every member will use it at least once.

ELLEN C. POTTER, M.D.,† Medical Director of the New Jersey Department of Institutions and formerly Pennsylvania State Secretary of Welfare, has been elected to succeed Dr. CHEVALIER JACKSON as President of the Woman's Medical College of Pennsylvania, at Philadelphia.

#### Southern States

MAX E. BLUE, M.D.,\* formerly of Burkesville, Ky., has been appointed Health Officer of Madison County to succeed Dr. CHARLES B. BILLINGTON, Richmond, who has entered military service.

ERVAL R. COFFEY, M.D.,\* formerly Assistant Chief, Domestic Quarantine Division, U. S. Public Health Service, has been appointed Assistant Surgeon General to head the division of sanitary reports and statistics.

LEONARD A. CROSBY, M.D., of Elkton, Ky., formerly Health Officer of Todd County, has been given supervision of Trigg, Lyon, and Caldwell Counties, which have been combined after health officers were called to military service.

GEORGE A. DAME, M.D.,† Inverness, Fla., has been appointed Director of the Nassau County Health Unit, succeeding Dr. IRVING E. SIMMONS, formerly of Fernandina, who has accepted a similar position in Coffee County.

JOHN D. FAULKNER,† Raleigh, has been appointed Sanitary Engineer in charge of the Office of Milk Sanitation for the North Carolina State Board of Health. He was formerly Consultant Engineer, Typhus Control Unit, Division of Epidemiology of North Carolina.

MAUDE M. GERDES, M.D.,† formerly consultant in obstetrics for the Children's Bureau, Washington, D. C.,

has been appointed Director of Maternal and Child Health of the Mississippi State Board of Health at Jackson, Miss.

ERWIN F. HOFFMAN, M.D.,† Sebring, Fla., Director of the Highlands County Health Unit, has resigned to accept an appointment as Assistant Epidemiologist for the State Board.

MARION F. JOHNSON, M.D., has been named City Health Officer of Fort Myers, Fla.

HARALD H. LUND has been appointed Executive Secretary for the District of Columbia Tuberculosis Association, Washington. Mr. Lund was formerly connected with the Justice Department of the federal government.

WILLIAM D. MAY, M.D., formerly of Durant, Miss., has been appointed Director of the State Health Department personnel training center at the Lauderdale County Health Department. He succeeds Dr. ROBERT L. SIMMONS,† who has been made Director of the Pearl River County Health Department in Poplarville.

J. R. MCGIBONY, M.D., has been appointed Director of Health of the U. S. Indian Service, according to an announcement by Secretary of the Interior Harold L. Ickes. Dr. McGibony succeeds Dr. JAMES G. TOWNSEND, Director of Indian Health from 1933-1941, who was recalled from the Indian Service by the Public Health Service last February to become Director of Industrial Hygiene for the National Institute of Health. Dr. McGibony is detailed to the Indian Service from the U. S. Public Health Service where he has held a commission since 1936. Since 1938 he has served as Hospital Administrator of the Indian Service.

JAMES O. NALL, M.D.,† Marion, Ky., has been given supervision of Livingston and Crittenden Counties which have been combined as a result

\* Fellow A.P.H.A.

† Member A.P.H.A.

of health officers being called to military service.

CHARLES EDGAR REDDICK, M.D.,† Paducah, Ky., has been appointed Health Officer of McCracken County to succeed DR. RUSSELL E. TEAGUE, Paducah, who has been appointed Assistant State Epidemiologist.

HARRY B. SMITH, M.D.,† Tavares, Fla., has resigned as Director of the Lake County Health Department to become Epidemiologist for the State Board of Health. He will be succeeded in Lake County by DR. ARTHUR W. NEWITT,† formerly Director of the Bureau of Epidemiology, Michigan State Department of Health, Lansing.

MYRTLE LEE SMITH, M.D., Nashville, Tenn., has been named Health Officer of Choctaw County, succeeding DR. THOMAS T. BOX.

EDWARD M. THOMPSON, M.D., Russellville, Ky., has been appointed Health Officer of Todd and Logan Counties, which have been combined after health officers were called to military service.

GEORGE H. ZEREST, M.D.,† formerly of Sumter, S. C., has been appointed to succeed DR. JAMES L. MIMS, Lexington, as Health Officer of Lexington County.

#### Western States

NORMAN E. IRVINE, M.D., Lebanon, Ore., was recently elected President of the State Board of Health, and DR. WENDELL H. HUTCHENS, Portland, Vice-President.

WILLIAM F. SMITH, M.D., Lander, Wyo., has been appointed to the State Board of Health.

#### Alaska

ERNEST A. COOK, M.D.,† former medical missionary serving in Alaska and

Labrador, has been named Director of the Randolph County Health Unit succeeding DR. WINSTON A. EDWARDS, who resigned to enter private practice. Dr. Cook recently completed a course of special training at the station maintained by the State Department of Health at Opelika, Ala.

#### Canada

CHARLES W. MACMILLAN, M.D.,† has become Chief Medical Officer of the Province of New Brunswick, Canada, with offices in Fredericton, succeeding DR. WILLIAM WARWICK.

#### DEATHS

EDWARD CLARK, M.D., Buffalo, N. Y., died on February 28. Dr. Clark was Past-President of the Erie County Medical Society, and formerly District State Health Officer of Erie, Genesee, Niagara, and Orleans Counties.

JOHN ROSSLYN EARP, DR.P.H.,\* Medical Editor, Division of Public Health Education, New York State Health Department, Albany, N. Y., and former Director of the Bureau of Public Health of New Mexico, died May 19.

MORTON G. LLOYD, PH.D., of Washington, D. C., died April 26. Dr. Lloyd was Chief of the Safety Codes Section of the National Bureau of Standards since 1917. He was a member of the Committee on Hygiene of Housing of the American Public Health Association.

FRED MOORE, M.D., Des Moines, Iowa, died on April 8. Dr. Moore was Director of the health department of the public schools of Des Moines and was on the staffs of several hospitals.

MATTHIAS NICOLL, JR., M.D.,\* former Commissioner of Health of New York State and former Health Commissioner of Westchester County died May 13.

\* DECEASED  
\* DECEASED

## CONFERENCES AND DATES

- American Association of Public Health Dentists. Annual Meeting. Lamar Hotel, Houston, Tex. October 26-28.
- American College of Surgeons. Hotel Statler, Boston, Mass. November 3-7.
- American Home Economics Association—34th Annual Meeting. Stevens Hotel, Chicago, Ill. June 22-26.
- American Hospital Association. Atlantic City, N. J. September 15-19.
- American Library Association. Annual Meeting. Boston, Mass. June 19-25.
- American Medical Association—92nd Annual Meeting. Cleveland, Ohio. June 2-6.
- American Optometric Association—44th Annual Congress. Ambassador Hotel, Atlantic City, N. J. Week of June 29.
- American Physiotherapy Association—20th Annual Conference. Asilomar, Pacific Grove, Calif. July 13-18. (Graduate Program in Physical Therapy, sponsored by the American Physiotherapy Association. Stanford University Medical School, San Francisco, Calif. June 23-July 18.
- American Public Health Association—70th Annual Meeting. Convention Hall, Atlantic City, N. J. October 14-17.
- American Society of Civil Engineers—Summer Meeting. San Diego, Calif. July 23-25.
- American Society of Heating and Ventilating Engineers—Summer Meeting. San Francisco, Calif. June 16-20.
- American Water Works Association—61st Annual Convention. Royal York Hotel, Toronto, Ont., Can. June 22-26.
- Western Pennsylvania Section—Eric, Pa. August 7-9.
- New York Section—Hotel Queensbury, Glens Falls, N. Y. September 11-12.
- Rocky Mountain Section—LaFonda Hotel, Santa Fe, N. M. September 18-19.
- Michigan Section—Hotel Plantlind, Grand Rapids, Mich. September 24-26.
- Minnesota Section—Nicollet Hotel, Minneapolis, Minn. October 9-11.
- Southwest Section—Fort Worth, Tex. October 13-16.
- New Jersey Section—Atlantic City, N. J. October 16-18.
- Missouri Valley Section—Cedar Rapids, Iowa. October 20-22.
- California Section—Fresno Hotel, Fresno, Calif. October 22-25.
- Kentucky-Tennessee Section—Hotel Andrew Jackson, Nashville, Tenn. October 27-29.
- Federation of Sewage Works Association. New York, N. Y. October 9-11.
- Florida Public Health Association. Orlando, Fla. December, 1941.
- Food Conference—under the auspices of the Institute of Food Technologists, Pittsburgh, Pa. June 16-18.
- Health Officers and Public Health Nurses—Annual Conference. Under the auspices of the New York State Department of Health. Grand Union Hotel, Saratoga Springs, New York. June 24-26.
- Heating, Piping & Air Conditioning Contractors National Association. San Francisco, Calif. June 16-20.
- Idaho Public Health Association. Lewiston, Ida. October 6-7.
- Institute of Government. University of Southern California, Los Angeles, Calif. June 9-14.
- International Conference of the New Education Fellowship. University of Michigan, Ann Arbor. July 6-12.
- Michigan Public Health Association. Grand Rapids, Mich. November 12-14.
- National Conference of Social Work. Atlantic City, N. J. June 1-7.
- National Education Association. Boston, Mass. June 29-July 3.
- New England Conference on Tomorrow's Children—Second. Littauer Center, Harvard University, Cambridge, Mass. July 16-18.
- New Mexico Public Health Association. Gallup, N. M. October.
- New York State Association of Dairy and Milk Inspectors. Annual Meeting. Hotel Statler, Buffalo, N. Y. September 24-26.
- New York State Association of School Physicians. Grand Union Hotel, Saratoga Springs, N. Y. June 23.
- Pacific Heating and Air Conditioning Exposition. Exposition Auditorium, Civic Center, San Francisco, Calif. June 16-20.
- Special Libraries Association. Hartford, Conn. June 16-19.

### Canada

- Canadian Public Health Association—30th Annual Meeting. Chateau Frontenac, Quebec, Que. June 9-11.

### Foreign

- International College of Surgeons. Mexico City, Mexico. August 10-13.
- Pan American Medical Association—8th Congress. Buenos Aires, Argentina. 1941.
- Second Inter-American Congress of Municipalities. Santiago, Chile. September 15-21.

# Best Sellers in the Book Service for May

Control of Communicable Diseases. Revised .....	\$ .25
Community Organization for Health Education. Report of the Committee of the Public Health Education Section and the Health Officers Section of the American Public Health Association .....	.09
Diagnostic Procedures and Reagents. Technics for the Laboratory Diagnosis and Control of the Communicable Diseases. American Public Health Association .....	2.75
Manual of the Common Contagious Diseases. 3d ed. Philip Moen Stimson .....	4.00
Manual of Public Health Bacteriology and Chemistry. 2d ed. Department of Public Health, San Francisco .....	1.50
Manual of Public Health Nursing. 3d ed. National Organization for Public Health Nursing .....	2.50
Military Preventive Medicine. 3d ed. Lieut. Col. G. C. Dunham .....	3.25
Municipal and Rural Sanitation. 2d ed. Victor M. Ehlers and Ernest W. Steel .....	4.00
Seventh Institute on Public Health Education. American Public Health Association .....	1.00
Viruses and Virus Diseases. Thomas R. Rivers. Cloth .....	2.50

## Order from the Book Service American Public Health Association

1790 Broadway

New York, N. Y.

### MEMBERSHIP NOMINATION BLANK FOR THE USE OF A.P.H.A. MEMBERS AND FELLOWS

American Public Health Association, 1790 Broadway, New York, N. Y.

I nominate the following persons for membership in the American Public Health Association:

NAME ..... ADDRESS .....

NAME ..... ADDRESS .....

NAME ..... ADDRESS .....

I wish these individuals to be invited to membership as I have indicated below:  
(check method desired)

(1) Send me application blanks and descriptive material and I will extend the invitation personally.....

(2) I authorize the Membership Department to extend the invitation, mentioning my name.....

SIGNED ..... ADDRESS .....

Anyone engaged or interested in public health work is eligible to apply for membership in the American Public Health Association. The annual dues are \$5 and this includes a subscription to the American Journal of Public Health, the annual Year Book, use of the Book Service, Information and Employment Services, and the many other advantages derived from affiliation with this professional society.